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# ROUND NUMBERS IN WAGES AND PRICES.

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It is of great though of usually unrecognized importance that the measures of distance, area, time, value, weight, and bulk used by a people should strike, in their combination and use, a proper balance between convenience on the one hand and accuracy on the other. The importance of the size and groupings of the units in which wages and prices are expressed becomes apparent as we consider the imperfect nature of most of our measurements and the consequently important part played by estimates. If estimates can be shown to be freely used in determining wages and prices, any peculiarities that may be exhibited by them will certainly be important. On the other hand, if we know the peculiarities of estimates we can by those signs discover them and determine their frequence. The aim of this paper is to point out some of the peculiarities of estimates, especially to consider their relation to convenient or usual quantities or to the so-called round numbers. Paul Leroy-Beaulieu, having in mind the peculiarities of retail trade, says, on the subject of the monetary unit: —

"We believe that the smallness of the monetary unit has no influence whatever upon wholesale prices of goods, but that it has, on the contrary, an influence upon the remuneration in certain professions, and upon many current household expenses. It seems to us certain that here, in France, if the unit fixed were the shilling (1fr. 25c.), instead of the franc, in most cases where one now pays a franc, such as entrance to a theatre and other amusements, it would as a shilling rise to 1fr. 25c. In the same way the penny is worth a little more than 2 sous (10 centimes): it is therefore clear that if the penny were the division of money adopted in France, you would always have to give a penny where you used to give two sous. It would be the same in the payments of the liberal professions. The louis d'or, or napoleon of 20 francs, is the usual fee for a visit to a consulting physician or a barrister. If the gold coin of 25 francs were adopted in France, we may be sure that at the end of a very short time it would in all cases be substituted for the louis or napoleon, and thus the coin of 12fr. 50c. would have taken the place of that containing 10fr. . . . . In wholesale prices competition acts with almost mathematical precision, but in retail prices, in amusements, in the fees of many professions, where the ordinary divisions of small change are adhered to, there is a sort of routine established which would be found very difficult to change." *

The tendency toward round numbers is toward the economy of an easily remembered and easily handled number in which to sum up a complete transaction. It shows itself particularly where the amount is small and accuracy is not insisted upon. The tendency is most powerful among those classes of people who are not accustomed to accurate thinking, especially in mathematical calculations. A desire to minimize a given set of facts sometimes results in clinging to round numbers which long have ceased to be even approximately representative. This appears most clearly in statistics of age. An illustration of this may be seen in the following figures taken from the *Report of the Illinois Bureau of Labor* for 1892, pages 300, 301. The columns below give the ages reported by women engaged in industry in Chicago. The total number reporting is 3467.

* *Bankers' Magazine*, London. Vol. 41, pp. 828, 829.

| | | |
|---|---|---|
| Under 14 years, . . . 10 | 22 years, . . . . . 201 | 31 years, . . . . . 17 |
| 14 years, . . . . . 73 | 23 " . . . . . 208 | 32 " . . . . . 19 |
| 15 " . . . . . 177 | 24 " . . . . . 139 | 33 " . . . . . 13 |
| 16 " . . . . . 280 | 25 " . . . . . 135 | 34 " . . . . . 11 |
| 17 " . . . . . 339 | 26 " . . . . . 96 | 35 " . . . . . 21 |
| 18 " . . . . . 401 | 27 " . . . . . 66 | 36 " . . . . . 12 |
| 19 " . . . . . 335 | 28 " . . . . . 50 | 37 " . . . . . 6 |
| 20 " . . . . . 356 | 29 " . . . . . 25 | 38 " . . . . . 7 |
| 21 " . . . . . 282 | 30 " . . . . . 69 | Over 38 years, . . . . 59 |

The round-numbered estimate is indicative of several things. It marks a compromise for practical purposes when an exact determination of the quantities involved is difficult or impossible. Thus a professor is paid $1500 because no one is presumptuous enough to say that he can determine that a professor's services to society are worth $7.00 or $57 more or less than this. But we need not resort to purely intellectual services. No builder of a house can so closely estimate the cost of a structure, the length of time it will endure, the probable increase or decrease in the value of a location, and the variation of the rate of interest, that he is in a position to say that a house ought to rent for 50 cents more or less than a given sum per month. Again, estimates may indicate a poor memory, lack of attention to details, the absence of a definite unit of measure from the mind, due to imperfect education, etc. Our schools disdain to show a boy how long a rod looks, how heavy a pound feels in the hand, how large an acre is, to say nothing of how valuable a dollar is to the majority of men.

The use of round numbers in values sometimes indicates disdain for careful calculation. Bets and braggadocio, as well as ignorance and sloth, run to round numbers. The admiration of the American for large businesses, for large expenditures, for large undertakings of every sort, works a serious evil when the American mind mistakes exactness for penuriousness. As a rule Americans greatly overpay little services. The fact that a gratuity of less than 25 cents in some sections

is thought contemptible, may in the future form the basis of a most extortionate system, should the parvenu be as effective as he has been in the recent past in dragging the tipping system into a country where an open contract for wages has always been the rule between employer and employed. Round numbers frequently locate for us those fields in which propriety dictates that economic motives, which prompt to exact measurements of value, shall be made subordinate to other considerations.

Estimates indicate uncertainty. They are met most frequently in the statement of what is mere opinion. They sometimes are and sometimes are not involved as determinative economic factors. The chief importance of this distinction is that, as a given set of facts develop into economic significance, greater care is taken in their calculation and round numbers give way to more exact expressions. Measurement excels the estimate in accuracy within the lines in which it operates; it falls below it for practical business in so much as it lacks comprehensiveness. The safest business methods combine measurement and estimate.

Customary groupings of units of measure take place chiefly on the multiples of five, and, in dealing with large numbers, multiples of ten, one hundred, etc. The use of multiples of two shows itself in a less degree and in small numbers only. There are certain groupings retained by custom, and accountable on other grounds than economy, such as the dozen, stone, yard, etc. There are also a number of indefinite units of measure retained in almost constant use, because their very lack of accuracy accommodates the indefiniteness of our ordinary concepts. Examples of these are: For distance, "a stone's throw;" for time, "a jiffy" and "a coon's age." It is perhaps significant of greater accuracy in the measurement of value that for it such indefinite expressions are little used.

Although estimates are distinguished by the use of round numbers, all computations which include an estimated com-

ponent factor do not show the round numbers. When an estimated factor is multiplied into one which is the result of accurate measurement, the round numbers, of course, disappear. Resultants expressed in exact figures, but which include estimated component factors, are presumptions so far as the digits affected by the embodied estimates are concerned. Estimates appear in economic transactions wherever the ignorant and unskillful are a party. They also characterize attempts to put a money valuation upon intellectual and moral forces. Estimates, therefore, appear in retail rather than in wholesale trade, and characterize salaries.

If we were to attempt to determine the wages likely to be offered to an individual, in a given case, we should probably be conscious that we were determining the resultant of a large number of contributory influences. We should be called upon to consider the length of time for which services were to be paid, the intervals between stretches of work, the quality of the service rendered, the conditions of the market as these are usually understood, standard of life, etc.

The study of estimates goes to show that to the considerations above enumerated we should add that wages are modified by the size and groupings of the units in which work-time is measured, as hours, days, weeks or months; also by the money units in which payments are made, and their groupings into dimes, quarters, and dollars. Furthermore, we should know the usual classes into which workmen are divided. The class of considerations last mentioned may not, in any individual case, be as important as those previously enumerated, but it seems probable that they are more constant and all-pervasive. To take up, then, these various measurements in the most natural order, let us examine as to the length of the period of labor employed as the unit for reckoning payment. The value of a man's services to an employer can usually be fixed within certain limits only. An upper and a lower figure can be placed with considerable certainty. In the bargaining of the market the employer

says, "Your services are not worth over so much." The other says, "They are worth at least so much." The personal equation and the intrenched economic position of the parties determine at what point between this maximum and minimum the bargain will be concluded. For certain services the yearly value can be more closely estimated than the daily or monthly. For other services the opposite is true. A number of time-units may be employed in paying wages. Carpenters are paid in Wisconsin by the hour, the day, the week, the month, the year, and the job, with and without board. Between these various methods of payment discrepancies exist, which in part arise from a desire to express in convenient round numbers the wages of the labor-time which has been chosen as the unit of payment. When there are in use various ways of paying labor, comparisons become difficult. The statisticians are not the only ones who are inconvenienced by this fact, for because of this confusion of method the wage-earning classes can form a less clear and complete idea of the prevailing wage levels than would otherwise be possible. The terms of their employment thus become the subject of special agreements made each time with the employer. The workman is at somewhat the same disadvantage as is the buyer of a fine painting or rare piece of bric-a-brac, in comparison with one who buys a definite quantity of a well-known brand of canned beef, or canned fruit, or thread. Thus it sometimes happens that persons who desire to underpay their employees adopt an unusual method of payment in order to make comparisons with the wages of other employers more difficult.

The difficulty that confronts labor bureaus, and the confusion of the labor market arising from various methods of payment, can well be illustrated from the statistics of Wisconsin. In answer to inquiries directed to various Wisconsin employers by the State Bureau of Labor in 1893, the fact was brought out that third-year carpenters of pretty even grade were paid at the rate of $30 per month, $200 per year,

$1.50 per day, 20 cents per hour, and $12 per week. If we were to calculate yearly wages these rates would be, respectively, $360, $200, $465, $558, and $624; or, counting employment for the half-year only, except in the case of a yearly wage, the rates would be $180, $200, $232.50, $279, and $312.

The use of round numbers shows itself again in a working day of eight and ten hours, rather than one a quarter or a half hour longer or shorter, such as would undoubtedly have been used had it so happened that an hour was 55 or 65 minutes, instead of 60.

The inaccuracies of time estimation are, however, unimportant in comparison with those in the estimation of talent. There is a rough concept in the minds of employers of what is called a "three-dollar-a-day" man, a "two-dollar-a-day" man, a "one-dollar-a-day" man, and a "boy;" but even for the most mechanical labor the discrimination is seldom closer than two and a half cents per hour, a quarter of a dollar per day, five dollars per month, etc. On the streets and in the harvest fields one often sees a group of men paid at the same rate, but bearing a very different proportion of the "burden and heat of the day."

The larger the element of skill involved in labor, and the more the intellectual factors decide the success or failure of an exertion, the more difficult it becomes to fix exactly the compensation due for a certain service. Hence salaries are in part distinguished from wages by the greater frequence of estimates and consequently the greater use made of round numbers. Let us illustrate the difference between wages and salaries by two parallel columns, one taken from the United States Treasurer's estimates of expenditures, giving government salaries and arranged consecutively according to amount; the other taken from the *Report of the Maine Bureau of Labor* for 1891. The latter gives the wages of shoemakers, and we have chosen, in order of their amounts, the highest 15 out of 136.

| Salaries.* | | Wages.† | |
|---|---|---|---|
| President's private secretary, | $5,000 | No. 45 (consecutive) | $767 |
| " assistant secretary, | 2,500 | " 97, | 748 |
| Executive clerk, | 2,000 | " 111, | 724 |
| Clerks, Class 4, | 1,800 | " 85, | 720 |
| " Class 3, | 1,600 | " 112, | 702 |
| Door-keeper. | 1,400 | " 87, | 700 |
| Engineer and fireman, | 1,000 | " 104, | 692 |
| Watchman, | 900 | " 75, | 680 |
| Messenger, | 840 | " 1, | 675 |
| Packer, | 720 | " 110, | 668 |
| Carpenter's helper, | 660 | " 23, | 667 |
| Watchman, | 540 | " 49, | 660 |
| Coal passer, | 500 | " 32, | 654 |
| Laborer, | 480 | " 50, | 650 |
| Charwoman, | 240 | " 25, | 648 |

Although the column of wages is compiled from private budgets, it undoubtedly contains some estimates, and these aid in accounting for the round numbers appearing in it.

Many of our state bureaus of labor have attempted to collect material from the private account books of workmen, to show their actual income from all sources, and their expenditures. In such inquiries the tendency toward round-numbered estimates has constantly to be met. To illustrate: An unskilled painter reports to the Maine Bureau of Labor that his yearly earnings are $490. Of this he reports $100 as spent for rent, which means that his monthly rent was $8.33. He reports $200 spent in food, $100 in clothing, and $42 for fuel and light, which, together with $58 for miscellaneous expenditures, makes another even hundred. Thus his total expenditures foot up neatly to $500, leaving him exactly $10 behind on the year.‡ Such returns must be set down at once as estimates. The study of private budgets is blocked by those who in this manner return estimates rather than take the trouble to keep an exact memorandum of expenses and income.

A very large number of budgets of expenditure and income for workingwomen of Chicago is given in the *Seventh*

* *Estimates of Appropriations*, 1895-96, pp. 16, 17, 19, 23, 41.
† *Report of Maine Bureau of Labor*, 1891, pp. 94-107.
‡ *Report of Maine Bureau of Labor*, 1891, pp. 34, 35.

*Annual Report of the Illinois Bureau of Labor Statistics.* Turning to Table V, if we select the reports of employees of department stores as fairly typical, we have 142 budgets that can be studied. Noting the round numbers in the various items reported, we can tabulate our observations as follows: —

ITEMS REPORTED.

| | Earnings. | | Expenditures. | | Savings.* | | Board and Room. | | Clothing. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. |
| Total Number of Reports.... | 142 | 100.00 | 142 | 100.00 | 27 | 100.00 | 90 | 100.00 | 141 | 100.00 |
| Divisible by 5.. | 54 | 38.00 | 50 | 35.21 | 17 | 62.96 | 39 | 43.33 | 125 | 88.65 |
| Divisible by 10 | 38 | 26.76 | 35 | 24.65 | 13 | 48.14 | 28 | 31.11 | 72 | 51.06 |
| Divisible by 25 | 19 | 13.38 | 18 | 12.68 | 7 | 25.96 | 5 | 5.55 | 60 | 42.55 |
| Divisible by 100 | 10 | 7.04 | 9 | 6.34 | 2 | 7.41 | 2 | 2.22 | 22 | 15.60 |

| | Assistance to Others. | | Sickness. | | Car Fare. | | Dress Making. | | Other. | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. | No. | Per Cent. |
| Total Number of Reports.... | 105 | 100.00 | 52 | 100.00 | 136 | 100.00 | 127 | 100.00 | 140 | 100.00 |
| Divisible by 5.. | 31 | 29.52 | 20 | 38.46 | 42 | 30.88 | 77 | 60.63 | 105 | 75.00 |
| Divisible by 10 | 21 | 20.00 | 8 | 15.38 | 30 | 22.06 | 45 | 35.43 | 53 | 37.86 |
| Divisible by 25 | 5 | 4.76 | 5 | 9.61 | 2 | 1.47 | 15 | 11.81 | 14 | 10.00 |
| Divisible by 100 | 2 | 1.90 | .... | ..... | ... | ..... | .... | ..... | .... | .... |

The average figures for each class of entry are as follows: —

| | | | |
|---|---|---|---|
| Earnings, | $329.00 | Assistance to others, | $164.00 |
| Expenditures, | 313.00 | Sickness, | 15.00 |
| Savings, | 16.00 | Car-fare, | 28.00 |
| Board and Room, | 187.00 | Dress-making, | 16.00 |
| Clothing, | 71.00 | Other expenditures, | 20.00 |

These averages are given chiefly to point out that, in considering the occurrence of numbers divisible by 25 and 100 in these reports, we must recollect that many entries are too small to be divisible by such numbers. It will be seen that these averages give a false color of accuracy — a point noted earlier in the paper.

* These deficits are reported, one of $15, one of $9.00, and one of $7.00.

If we were to attempt to estimate a man's yearly income from his daily or weekly wages, it would be necessary to know the number of days or weeks that he was out of work. The subject of unemployment is accordingly one which has occupied an important position in the investigations of labor bureaus. For information they are compelled, however, to rely mainly upon the statements of the workmen themselves. Let us see how estimates affect us here and how they can be detected by round numbers. The New Hampshire Bureau of Labor, in its *Second Annual Report*, 1894 (pages 384, 385), prints the reports of New Hampshire workmen as to the length of time they were idle during 1894. The reports are distributed as follows: —

| Idle Weeks. | Number Reporting. | Idle Weeks. | Number Reporting. | Idle Weeks. | Number Reporting. | Idle Weeks. | Number Reporting. |
|---|---|---|---|---|---|---|---|
| 1 | 16 | 11 | 5 | 21 | 1 | 31 | 0 |
| 2 | 60 | 12 | 23 | 22 | 2 | 32 | 0 |
| 3 | 28 | 13 | 8 | 23 | 0 | 33 | 4 |
| 4 | 13 | 14 | 6 | 24 | 0 | 34 | 0 |
| 5 | **37** | 15 | **21** | 25 | **33** | 35 | **2** |
| 6 | 15 | 16 | 6 | 26 | 0 | 36 | 1 |
| 7 | 21 | 17 | 43 | 27 | 4 | 37 | 0 |
| 8 | 28 | 18 | 1 | 28 | 0 | 38 | 1 |
| 9 | 10 | 19 | 0 | 29 | 2 | 39 | 0 |
| 10 | **36** | 20 | **15** | 30 | **3** | 40 | 0 |

The total number of persons reporting is 443. It will be seen by inspecting these columns of figures that a much larger number of men report having been idle five weeks than report four or six weeks. A much larger number report ten weeks than report nine or eleven. This betrays the fact that many of the returns are estimates. The number of persons reporting eight weeks undoubtedly includes some who estimated two months and counted it as eight weeks. At seventeen weeks we encounter a very large number of reports that seem to form an exception. Here we have undoubtedly some such a calculation as this: "Idle four

months" (estimated). To reduce this to weeks, multiply 4 by 30 and divide the 120 by 7, giving as the result 17⅐. The record is placed at seventeen weeks. Some of the reports of twenty-five weeks doubtless represent an estimate of six months' idle time, and some of thirty weeks mean two-thirds of a year. Excepting these numbers that have been explained, it will be readily seen that the most prominent peculiarity of the reports is their cumulation on 5 and its multiples, 15, 20, 25, 30, and 35.*

If we turn our attention very briefly to prices, keeping in view mainly the expenditures of such wage-earners as we have been considering, we shall see another and an equally important side of this subject. The meaning of a given wage depends upon its power to purchase those articles which constitute the necessaries of life, and its power to reach up into comforts and luxuries. If we examine the expenditures of wage-earners we find that they are very greatly influenced by the occurrence of round numbers in retail prices. The round numbers of prices ought, however, not to be confused with the round numbers that occur in estimates of expenditures which were discussed on a preceding page.

Throughout the consideration of this subject we ought not to forget that in all probability the use of round numbers works, in the majority of instances, to the detriment of the wage-earning classes. When just compensations fall between two convenient round numbers, if it is a case between the employer and the employee for wages, or between the landlord and tenant for rent, or between the merchant and customer (especially the credit customer) for food or clothing, the latter party in each case will usually be the one forced to give way, and the round number most favorable to the stronger of the two bargainers will be chosen. The higher rather than the lower unit will be forced upon the workman in expenditures, and the lower rather than the higher in

* An interesting parallel to these figures can be seen on pages 378, 379 of the report here referred to.

income. This margin of convenience, if we may so call it, when always exacted from one party, is by no means an insignificant matter.

Let us consider, first, expenditures for rent. The *Tenth Annual Report of the Michigan Bureau of Labor* (1893) tabulates on pages 788 and 789 the rent paid by 13,719 Michigan workmen. The rents paid and the numbers reporting each rent are given, as follows: —

| Rent. | Number Reporting. | Rent. | Number Reporting. | Rent. | Number Reporting. | Rent. | Number Reporting. |
|---|---|---|---|---|---|---|---|
| $1.00 | 42 | $4.00 | 191 | $6.75 | 2 | $10.75 | 1 |
| 1.50 | 1 | 4.25 | 7 | 7.00 | **506** | 11.00 | 138 |
| 2.00 | 11 | 4.50 | 33 | 7.50 | 29 | 11.50 | 7 |
| 2.25 | 1 | 5.00 | **520** | 8.00 | **744** | 12.00 | **343** |
| 2.50 | 44 | 5.25 | 1 | 8.50 | 11 | 12.50 | 3 |
| 2.75 | 3 | 5.50 | 22 | 8.67 | 1 | 13.00 | 189 |
| 3.00 | 98 | 5.75 | 1 | 9.00 | 268 | 13.50 | 1 |
| 3.25 | 8 | 6.00 | **577** | 9.50 | 3 | 13.75 | 2 |
| 3.50 | 56 | 6.25 | 2 | 10.00 | **565** | 14.00 | 101 |
| 3.75 | 5 | 6.50 | 17 | 10.50 | 2 | 15.00 | 23 |

It will be noticed that the rents expressed in even dollars are decidedly in the majority. Thus 506 persons report a rent of $7.00 per month, and 744 persons report $8.00, while but 29 persons report $7.50. But one rent breaks into the division of the quarter of a dollar, and this is $8.666, which comes out even dollars if payment of rent is made quarterly or yearly. The rents in which a half-dollar occurs are as much more popular than those with twenty-five cents or seventy-five cents, as rents in even dollars are more popular than all others. Eight dollars is the most popular rent figure, and the number of reports declines as the rent varies from this amount. Against the decline, however, $6.00 and $5.00 hold out below, and $10 and $12 hold out above eight dollars. Reports similar to these can be found in other parts of the volume above mentioned.

These figures show that landlords are students enough of human nature to know that if the rent of a house ought to be

about nine dollars per month they can as easily get ten dollars. They show that if a rent ought to be any given number of dollars, plus a half-dollar, an additional half-dollar can as easily be obtained, making the price of rent even dollars. Probably, if a rent were left with a half-dollar appearing in it, the ordinary tenant would be dissatisfied, and an attempt would be made to get it thrown off, while there would be no thought of getting a half-dollar taken from a rent expressed in even dollars. Besides this, the figures just given show an inability to determine accurately what rent should be; hence estimates, drifting as usual to common and typical figures, are to be found in the reports.

In following the expenditures of a workman's budget let us turn to lines where the distinction of wholesale and retail exists. As the record of wholesale and retail prices is not easily ascertained for places in the United States, let us, for convenience, take up German statistics. Only a few of the more striking examples can be drawn upon in illustrating our point. The characteristic differences between wholesale and retail prices are illustrated by the records of wholesale and retail prices of rye flour for the months of 1891 and 1892 for the city of Berlin.*

WHOLESALE PRICE OF RYE FLOUR, BERLIN, PRUSSIA, BY MONTHS.

Price, per 10 Kilograms (22.046 Pounds), in Marks.

| | 1891. | 1892. | | 1891. | 1892. |
|---|---|---|---|---|---|
| January | 1.72 | 3.02 | July | 2.14 | 2.52 |
| February | 1.72 | 2.92 | August | 2.33 | 2.00 |
| March | 1.77 | 2.91 | September | 2.26 | 1.97 |
| April | 1.84 | 2.68 | October | 2.31 | 1.91 |
| May | 1.99 | 2.63 | November | 2.36 | 1.80 |
| June | 2.09 | 2.62 | December | 2.35 | 1.74 |

Retail price was 3.30 in January; 3.40, February to July, inclusive: 3.70, August to December; 3.60, January, 1892; 3.50, February; 3.30, March to November, inclusive; 3.00, December.

* *Statistisches Jahrbuch für deutsche Städte*, 1893, pp. 136-147.

The wholesale price would be indicated by a broken record line, the retail price by a continuous line. The wholesale price is variable, fluctuating in response to every influence on the market. It makes both infinitesimal and large variations, and does so at irregular intervals. It shows no conformity to round numbers or to convenient methods of calculation. It may be said to coast close to the actual cost of production, yielding at the slightest pressure from any direction and changing with the nervous sensitiveness of fear as the forecasts of the market change. The retail price, on the other hand, seems to move according to an altogether different law. It strikes boldly out, and lays between itself and the wholesale price a good round margin. It moves in a more mechanical way than does the wholesale price, and responds slowly to change, seeking convenient round numbers and clinging persistently to ascertained price levels. When it does change it shows evidence of having broken through strong restraints, — through a "cake of custom," perhaps,— for it makes leaps of considerable distance in a short period. While the wholesale price, in the period we have considered, registers twenty-four different monthly levels, the retail price registers but six.

If we place side by side the monthly averages of the wholesale and retail price of beef for the city of Strassburg in 1891, we shall note some of the same differences before observed.* The prices given in marks per kilogram, and representing in retail trade second choice of meat, are as follows: —

| Wholesale. | Retail. | Wholesale. | Retail. |
|---|---|---|---|
| 1.186 | 1.35 | 1.224 | 1.20 |
| 1.14 | 1.36 | 1.22 | 1.20 |
| 1.122 | 1.32 | 1.2125 | 1.20 |
| 1.155 | 1.28 | 1.22 | 1.20 |
| 1.152 | 1.26 | 1.205 | 1.20 |
| 1.2275 | 1.20 | 1.194 | 1.20 |

* *Statistisches Jahrbuch für deutsche Städte*, vol. III, pp. 138, 139, 141, 144.

The average monthly price of wheat per kilogram, wholesale, and of flour, retail, for Hannover in 1891 gives us much the same results. The prices in marks are: —

| Wheat (Wholesale). | Flour (Retail). | Wheat (Wholesale). | Flour (Retail). |
|---|---|---|---|
| 0.185 | 0.32 | .228 | .40 |
| .186 | .32 | .236 | .40 |
| .193 | .36 | .231 | .40 |
| .213 | .36 | .228 | .40 |
| .236 | .40 | .236 | .40 |
| .235 | .40 | .235 | .40 |

Although in this article we consider wholesale prices as relatively exact, it is not hard to find indications that even into them there enter many estimated factors. The demand for a certain class of goods has an influence upon the wholesale price; and when the demand is subject to fluctuation, or when articles are put upon the market for the first time, the extent of the demand must be an estimated factor. If we study the various elements of expense entering into the cost of an article, we shall find that, despite the admirable systematization of business and the usual precision of bookkeeping, few men can say exactly what proportion of the expense of an establishment a given piece of goods ought to bear, under the existing conditions of trade. The principle of charging "what the traffic will bear" must then be constantly recognized in fixing wholesale prices, and this is a process of estimation.

One of the important factors entering into wholesale prices we should readily admit to be payment of interest for capital invested in a business. The *Second Annual Report of the Montana Bureau of Agriculture, Labor, and Industry*, issued in 1894, gives in one part of its statistics the estimates of 163 business men as to the amount of the capital they have invested in their businesses. One capital occupies 7 decimal places and has ciphers in the first 5 places. Two capitals occupy 6 places and have 5 ciphers each. Seventy-three

capitals occupy 5 places and 31 have 4 ciphers; forty-one have 3 ciphers, and one has no cipher. Eighty-five capitals occupy 4 places and sixty-nine have 3 ciphers, while sixteen have 2 ciphers. Two capitals occupy 3 places and both have 2 ciphers. In the same report are to be found figures representing the payments for labor made by the same business concerns. These are somewhat more exact, but do not differ greatly in character from the above. The value of the product is given also, and these figures are only a shade more exact than those for capital. If these, then, be some of the elements which enter into wholesale prices, and the most determinate elements at that, and if we frequently find them to be estimates, what can we expect from wholesale prices in the way of accuracy? Undoubtedly we must make allowance for the fact that, while bureaus of labor can often obtain only estimates, business men who return these have more exact figures accessible for their own use and guidance.

Turning again to retail trade, we find that in it competition often exerts little or no effect upon prices. Competition may rather sometimes result in the division of trade among a number of dealers, each maintaining prices, or perhaps joining in an upward tendency of prices. In centres where public markets are maintained competition has often the effect of bringing retail prices to resemble wholesale. The estimated prices placed on goods then disappear and give place to those in which the retailer has accurately computed his expense and margin of profits. Retailers then rather resemble jobbers, who figure commissions, than typical retail dealers.

The difference between a large and small market, in the matter of estimates and in the calculation of margins, is a striking one. This difference can be seen by comparing the figures for the average monthly price of beef per kilogram in Berlin with the price of the same article in Potsdam, an aristocratic suburb.

| Berlin. (Price in Marks.) | Potsdam. |
|---|---|
| 1.34 | 1.40 |
| 1.30 | 1.40 |
| 1.28 | 1.40 |
| 1.29 | 1.40 |
| 1.28 | 1.40 |
| 1.27 | 1.40 |
| 1.30 | 1.40 |
| 1.30 | 1.40 |
| 1.28 | 1.40 |
| 1.28 | 1.40 |
| 1.28 | 1.40 |
| 1.28 | 1.40* |

* See previous reference.

Let us examine into the difference between retail markets in a portion of our own country by means of a comparison of certain prices at Antigo, Wis., with the prices of the same articles on the same dates at Racine, Wis.

The price of corn in Antigo, January 1st to May 21st, was 40 cents; from June 18th to December 3d, 38½ cents. The price of corn in Racine on successive dates was 49, 50, 45, 63, 71, 63½, 53, 55½, 61½, 63½, 52, 53, and 46½ cents, showing more numerous fluctuations.

Wheat in Antigo from January 1st to February 26th was 80 cents; March 26th to July 16th, 90 cents; August 13th to December 3d, 80 cents. The price of wheat in Racine, however, varied as follows: —

| | | | |
|---|---|---|---|
| January, | $0.82 | July, | $0.90 |
| February, | .90 | August, | 1.00 |
| March, | .92 | September, | .90 |
| April, | 1.05 | October, | .90 |
| May, | .92 | November, | .90 |
| June, | .95 | December, | .90 |

The price of beans in Antigo from January 1st to February 26th was $2.25; and from March 26th to December 3d, $2.87½. The price of beans in Racine showed the following changes: —

| | | |
|---|---|---|
| $2.35 | $3.25 | $1.87½ |
| 2.25 | 2.85 | 1.57½ |
| 2.27½ | 2.90 | 1.70 |
| 1.90 | 1.67½ | |
| 2.30 | 1.95 | |

Antigo is a place of about 5000 inhabitants, located in the northern part of Wisconsin, in a newly-opened region. Its products are lumber and furniture. It ships in a portion of its food supply large enough to materially affect the price. It has but a single line of railway, and is near no waterway or large market. Racine is a city of over 20,000 inhabitants, situated on Lake Michigan, but a short distance from Chicago, with which it is connected by rail as well as by waterway. The Chicago markets govern the prices of Racine. It will be readily seen, upon consulting these figures, that the prices of Antigo are typically retail, while those of Racine present numerous fluctuations, and in general exhibit the characteristics of wholesale prices.*

If space would permit it would be possible to show that large retail establishments in the centre of a large city approximate much nearer to wholesale prices than do small stores in residence quarters. The different regions of a country, indeed of a single city, might be plotted into different price areas if complete statistics were available. The indications are that such a map would show that competition is sadly distorted and often almost ineffective in retail trade. The retail system often works a nuisance by its lack of response to prevailing market conditions, and by failing to properly co-ordinate price and service. Retail trade, in a small way, is easy to enter. It is therefore frequently overloaded by those who attempt, by putting a wide margin on prices, to support themselves from a small patronage, depending upon local convenience. Since the marking of goods is for such dealers a sort of guess-work, prices display round numbers.

The mental inertia which causes customers to remember only certain commonly used quantities and values, and to carry away only general impressions, accounts for the at-

* For these figures I am indebted to Mr. W. C. Norton, a member of the class in statistics at the University of Wisconsin, who compiled them from newspaper files.

tempts of tradesmen to put a price in such figures that it will be thought of in connection with the lowest possible common price unit. To illustrate: We have 99-cent prices and 49-cent prices. That such prices exist proves the mental processes of the average customer to be imperfect, for it shows that a price can be suggested which is nine units lower than the actual price, before one is suggested which is one unit higher.

The instinctive demand of the average mind for customary conditions, in which it can feel safe, leads to numerous expedients on the part of producers and retailers to maintain fixed prices. A common practice, in case an article has enhanced in value, is to retain the well-known price, but slightly change the quality of the article. Many buyers trust so implicitly to price as a criterion of value, that great frauds in adulteration become possible. To say that an article was bought at So-and-so's establishment is thought by many people, even those capable of discriminating as to quality, to be worth an addition of 25 per cent in price. If a change of apparent price is to be avoided, another way sometimes employed is to bring out an article in a different stage of completeness than that in which it was previously offered. This makes it possible to slip in an amount sufficient to cover enhanced values while the cost of further preparation is being added. Although the price of meat fluctuates considerably in Germany, the prices of well-known makes of sausage remain practically stable. The varying slack or tension of competition is usually taken up by retail trade, which thus affords the customer convenient and customary prices.

The power of the inertia of the customer is one which manifests itself in innumerable ways. The study of the consumer and of the retail market ought to supplement the study of the producer and of the wholesale market in political economy. The small transactions, daily and sometimes hourly repeated by the mass of the people, have peculiarities

attached to them which are interesting alike for the psychologist, the economist, and the statistician. It is difficult to find tables of statistics into which estimated factors have not at many points entered. The value of these statistics cannot therefore be completely determined until we understand the peculiarities of social practice in the use of estimates.

*Remarks by James P. Munroe.*

It seems to me that Dr. Jones puts too much faith, by implication, in the accuracy of reported wholesale prices. It is true that they are far more sensitive than retail prices, and what may be called raw materials — food stuffs, hides, wool, etc. — seem to respond very quickly to the expansion and contraction of the market. But into market prices and reported cost prices of *manufactured* goods the "round-number tendency" enters, I think, more fully than he appears to believe.

Dr. Jones will doubtless agree that there are, roughly speaking, four classes of manufacturers, — those who know first costs and are honest; those who are honest and do not know first costs; those who know but do not care, so long as they can find some one to trust them; and, finally, those who neither know nor care. With the fourth class statisticians have little to do; but so easy are credits, and so sanguine are investors, that the second and third classes, often for considerable periods of time, dictate the selling price of many manufactured articles. Yet it is obvious that such selling prices have no place in accurate statistics, and might seriously vitiate conclusions derived from them.

But even were it possible to throw out such abnormal selling prices and the cost prices that by the usual percentage calculations would be derived from them, so that we should deal statistically with the figures of those manufacturers only who both know and care, we would still be hampered by the wholly concealed presence of many "round-number" estimates in figures that by their fractional character are deceptively accurate in appearance.

In fixing selling price the manufacturer must take into account the cost of what to him is raw material, of labor, of fuel, of "wear and

tear," of handling, and perhaps of storage, in addition to the fixed charges of interest, taxes, office expenses, etc., and other minor and fluctuating charges peculiar to each manufacture. His figures for labor cost and fixed charges will be pretty accurate; the first because they can be taken directly from his pay-rolls, and the second (except in a newly established business) because they are generally the average of a fairly uniform experience during a number of years. But the cost of raw material, often the largest item of cost, cannot be exactly determined, since it fluctuates (and the more "raw" the material the greater its fluctuation); since it cannot be bought in great quantity at a period of low prices without adding a large storage and interest charge; and since it, in turn, is subject to the same (or greater) uncertainties in its cost of production. So in calculating his cost price the manufacturer strikes an average somewhere between the highest and lowest prices that his raw materials are likely to reach, and, unless it should be too far away from the figure that his judgment approves, this average cost of raw materials will be a round number. The same result will appear in the case of fuel (or water power) and in many of the smaller items of fluctuating cost that must enter into his calculation. Therefore, I think, in the case of the usual honestly figured and faithfully reported "cost price," we are dealing with a hybrid figure made up of a minutely calculated labor and fixed-charge cost, and an estimated raw material cost, that may never once during the year express the actual cost. A further vitiation will often enter through the fact that the manufacturer, upon "feeling" the market and finding that he must "shade" a little, or can safely "raise" a little, is often inclined to review his estimates, with the result of depressing or elevating his "cost price" to the nearest round number. A final source of error to the statistician is to be found in the fact that he gets, as a rule, *past* figures, when these original errors in cost price per pound or per yard have been multiplied by hundreds of thousands, and this large sum has been divided by the "average yearly production" or some other *estimated* figure, giving a new "cost price," that by its fractional quality appears more accurate than would have seemed the original and much closer "round number" estimate.

*Remarks by Prof. W. F. Willcox.*

Perfect accuracy of measurement is an ideal unattained in any field. Where accuracy stops, and it always stops at last, round numbers begin. The term may be miles or millimeters, centuries or thousandths of a second, but as nature offers us a continuum, and we measure it by steps, the end is ever the same. The physical sciences have removed it to a remote distance, but they always reach it. Accuracy of measurement depends upon the number of steps that are introduced into the scale, and this upon the education of the persons using the scale and the employment of instruments of precision. Hence, in social phenomena, where the entire public must use the scale, and where instruments of precision have slight application, the scale must be a short one. One of the prime advantages of a money economy over barter is that it lengthens the scale, and so increases the accuracy of social measurements.

My attention has recently been called to the inaccuracies in the statements of age to which, in passing, Dr. Jones's paper calls attention. During the first twenty years of life there is a slight but traceable tendency to concentrate on the even years, and minima, rather than maxima, are found at five and fifteen. But after twenty the predominant tendency is to concentrate on the multiples of five with a minor but perceptible tendency to emphasize the multiples of two. Hence, the greatest concentration occurs at the multiples of ten, a less on the odd multiples of five, and the least on those multiples of two, *e. g.*, 28, 32, 38, 42, etc., which are not next to a five-year maximum. This tendency to concentrate on certain years may be roughly measured in the following manner: The true number of persons, say of thirty years of age, may be assumed to be one-fifth of the number reported, as 28, 29, 30, 31, or 32. If, from the number reported as 30, one-fifth of the sum be deducted, the remainder will represent approximately the number incorrectly reported as thirty. The percentage that this excess is of the whole sum may then be computed.

The foregoing method has been followed with the reported ages of the total population in 1880 and 1890, and its results are embodied in the table subjoined. Where no sign is printed, a + representing a maximum should be understood.

| Age. | Percentage of Concentration in : — | | Improvement in 1890. |
|---|---|---|---|
| | 1880. | 1890. | |
| 5 | — .02 | — .48 | — .46 |
| 10 | 1.24 | .97 | .27 |
| 15 | —1.37 | — .71 | .66 |
| 20 | .98 | — .05 | .93 |
| 25 | 2.48 | 1.02 | 1.46 |
| 30 | 9.44 | 7.05 | 2.39 |
| 35 | 8.33 | 5.09 | 3.24 |
| 40 | 13.45 | 9.11 | 4.34 |
| 45 | 10.25 | 7.81 | 2.44 |
| 50 | 12.70 | 10.91 | 1.79 |
| 55 | 5.67 | 3.10 | 2.57 |
| 60 | 15.94 | 12.98 | 2.96 |
| 65 | 8.27 | 6.37 | 1.90 |
| 70 | 11.55 | 10.31 | 1.24 |
| 75 | 6.22 | 5.08 | 1.14 |

The preceding table shows that at each five years of age after the first there was less concentration on the multiples of five at the last census than at the preceding. It may have been that with the progress of education a smaller proportion of the population had to guess at their ages, or that in the matter of ascertaining the actual age the enumerators worked with more care, or both. If the enumerators in 1890 were more careful to secure the exact age, as seems probable, it might furnish a reason for believing that in other respects also the Eleventh Census was taken more carefully than the Tenth. But doubt is cast upon the inference by finding that the "Instructions" issued to enumerators in 1880 said: "The exact age will be inserted whenever the same can be obtained; otherwise the nearest approximation thereto," while the "Instructions" issued in 1890 were much more specific: "The *exact* years of age for all persons one year old or over should be given whenever it can be obtained. In any event do not accept the answer 'don't know,' but ascertain as nearly as possible the approximate age of each person. . . . If the age is given as 'about 25,' determine if possible whether the age should be entered as 24, 25, or 26. Particular attention should be paid to this." Granting the greater care of the enumerators in this regard, it would not argue, therefore, that in subjects about which no difference between the instructions can be found they

were also more careful. The topic is worthy of further study, for not only may different censuses thus be compared, but also different states and cities and social classes about which the facts may be reported.

*Remarks by Horace G. Wadlin.*

Prof. Jones's interesting paper groups a series of examples that very forcibly illustrate the tendency to use round numbers, not only in fixing wages and prices, but in various other operations. His first table, relating to ages of women in industry, brings out the well-known concentration upon quinquennial periods which is always noted in every census of ages. For example, in 1885, in Massachusetts, the returns of the enumeration indicated 38,659 persons of age 20, while the numbers of ages 19 and 21 were 38,406 and 36,438, respectively. Again, 44,087 were reported as of age 25, while the numbers at ages 24 and 26 were 42,475 and 37,950, respectively. This concentration upon the "round" quinquennial periods is not due to estimating, however, so much as to the apparently natural tendency in making reply to the questions of the enumerators to select a round period, when the age of the person approximates it, rather than to rest upon an intermediate year. This error, so far as tables of ages are concerned, is partly counteracted by classifying the ages by periods, either decennial or quinquennial, thereby distributing the error over the entire number of years included within such periods.

Thus, in the Massachusetts Census of 1885, to which I again refer for the purpose of illustration, the population is classified by age periods 20 to 29, 30 to 39, etc., and in many computations based upon the census, these aggregates by age periods are used instead of the single-year figures.

As to the vitiation of data relative to wages and prices by the presence of round numbers in the tables, such round numbers apparently indicating estimates, it must, I think, be admitted that in nearly all statistical presentations there is an element of error. That is, almost all such presentations are approximate rather than absolute. And while every practical statistician is aware of this, and never relinquishes effort to diminish the amount of error, it is nevertheless true that such errors as are inherent in any particular line of statistics may be considered to have about the same weight at different periods and

in different places, so that the effect of such errors, being common to all the units considered, will be eliminated in comparisons based upon such units. To make this plain, I refer again to the tables of ages in which the particular error we are considering is especially manifest. If, for example, the general tendency operates to increase the number of persons reported of each quinquennial age period, and this tendency has substantially equal force in the Census of 1895 as in that of 1885, then comparisons showing percentages of increase or decrease of persons of age 20, 25, or any other decennial period, or any deductions based on such comparisons, will not be materially affected by the error. It is the comparative use of statistics which is perhaps most common, and which is usually of largest practical utility.

The misconception due to the use of round numbers does not appear to me to be at all commensurate with that due to the use of averages, which, especially as to wages and prices, are likely to be extremely misleading. Nevertheless, averages certainly have their place in statistical presentations, and are entirely legitimate when the elements upon which they are based are alike; while averages based upon dissimilar units, secured at a given time and place, may be legitimately compared with averages dissimilar to each other, but based upon units identical with those from which the first average was derived, secured at a subsequent time, or at a different place, and the difference in conditions observed in such comparisons may be accepted as accurately determined. That is, *the amount of error in each term of the comparison is equalized.* Of course, as to wages of groups of workmen, the error due to concentration upon round figures in individual cases may be largely neutralized by a classification, similar to that to which I have referred respecting ages, whereby all receiving, for example, under $5.00 weekly, $5.00 but under $6.00, $6.00 but under $7.00, etc., are grouped. And in many uses which are made of wage data such classifications are just as valuable as averages or individual figures, and much more exact than either.

Of course, data as to wages and prices should be as free as possible from estimates. It is not necessary in original investigation of these subjects to rely upon estimates. In an investigation conducted by the Massachusetts Bureau in 1883, wherein a very large number of quotations appear, the collection was made directly from the pay-rolls of great manufacturing establishments, or from the original wage-lists agreed upon between trade societies and employers. The same

method was followed in the collection of data in the well-known investigation undertaken by Senator Aldrich's committee in 1892.

Round numbers appear in the results of each of these investigations, but their presence is due to the fact, emphasized by Professor Jones, that, in establishing the wage or price, a round figure is evidently much more convenient in practical use; that is, the round wage or price, wherever it appears, represents the exact wage or price paid, — not an estimate made by those who collected the data. Wherever this is the case the statistical tables are not inaccurate, although round figures appear in them. As to the economic loss to the weaker party, either workman or consumer, involved in the fixing of wages or retail prices at round figures, this, as Professor Jones points out, may occur. But apparently no method has yet been determined of fixing either wages or prices at the exact point of equivalency of service or of cost of production, and it would seem impossible to thus fix them, apart from the general error due to the use of round numbers.

*Remarks by Roland P. Falkner.*

Round numbers, Dr. Jones shows, are of frequent occurrence in statistical tables. They may result from inaccuracy of statement, and therefore fail to properly represent the facts to be recorded, or on the other hand they may record an actual condition of affairs. Doubtless the same considerations are at work on both cases to produce the result. The same psychological tendency is observable in both, but in the one case it is mediate, in the other immediate. The two classes, while akin, should be rigidly separated by the statistician. In the first we have a psychological tendency affecting the statistical record and impairing its accuracy; in the second we have the same phenomenon affecting a given series of social or economic facts before it becomes the duty of the statistician to record them. These two cases may overlap and produce a third or mixed case, in which the psychological phenomenon which leads us to favor round numbers may affect not only the facts, but also the report which is made of them. In such a case we shall have a partially true but exaggerated distribution of the facts recorded.

In Dr. Jones's paper these three cases are not sufficiently distinguished. To the first class, where the tendency to round numbers is simply an expression of the inaccuracy of the evidence, belong the illustrations which give the age of women in Chicago industries, the household expenditures in Illinois, and the number of weeks unemployed of New Hampshire laborers. The conditions are here such that no one could pretend that any inherent tendency to round numbers could exist in the distribution of the facts themselves. On the other hand, a number of his illustrations which display the tendency to round numbers give a correct report of the facts. They are the salaries of government officers, retail meat prices in Strassburg, and retail flour prices in Hannover. It is possible that another illustration of the paper may belong to the third or mixed class. It is the statement of house rents in Michigan as reported by occupants. While there can be no doubt of the tendency on the part of landlords to fix rents in multiples of one dollar, it is also possible that the returns are affected by the natural tendency to express quantities in round numbers as approximately accurate. Much would depend upon the manner in which the figures were gathered, whether this latter element had weight.

In regard to the tendency toward round numbers which exists in the field of wages and prices, a veritable mine of information can be found in the Aldrich report on retail prices and wages. (Senate Report No. 936, First Session, Fifty-second Congress.) So far as I am aware, no analysis of the report from this point of view has been undertaken. It might be of interest, therefore, to examine the kind of material which it furnishes. The prices reported in the statement of retail prices were taken directly from the books, and represent actual facts. So far, therefore, as the figures show a tendency to round numbers, it is a tendency which rules in fixing retail prices, and is not merely an expression of greater or less accuracy in reporting them. In the following table the actual price quotations for earthenware articles in June, 1889, are summarized according as they are divisible by 5 and its multiples.

In each case the number of prices not divisible by 5 is a very small fraction of the total number of quotations. Considering the narrow limits within which the prices range, the number of quotations at $1.00 or multiples thereof cannot fail to attract attention.

TABLE I.

RETAIL PRICE QUOTATIONS FOR EARTHENWARE ARTICLES IN JUNE, 1889.

*Aldrich Report, Retail Prices and Wages*, Vol. III, p. 1574, *et seq.*

| Divisible by — | Breakfast Plates, No. 7, ordinary printed, per doz. Range, $0.70–$3.00. | Breakfast Plates, No. 7, white granite, per doz. Range, $0.50–$1.50. | Covered Dish, ordinary printed, oval, 8 inches, each. Range, $0.30–$1.50. | Covered Dish, white granite, oval, 8 inches, each. Range, $0.20–$1.10. | Teacups and Saucers, ordinary printed, with handles, per doz. Range, $0.75–$2.25. | Teacups and Saucers, white granite, with handles, per doz. Range, $0.40–$2.00. | Total. Range, $0.20–$3.00. | Total Percentages. |
|---|---|---|---|---|---|---|---|---|
| 100 | 32 | 56 | 31 | 12 | 22 | 38 | 191 | 20.85 |
| 50 and not 100 | 20 | 4 | 10 | 20 | 44 | 11 | 109 | 11.90 |
| 25 and not preceding | 35 | 20 | 38 | 26 | 34 | 37 | 190 | 20.74 |
| 10 and not preceding | 50 | 55 | 35 | 46 | 39 | 61 | 286 | 31.22 |
| 5 and not preceding | 10 | 20 | 25 | 43 | 12 | 15 | 125 | 13.65 |
| None of preceding | 2 | 4 | 5 | 2 | 0 | 2 | 15 | 1.64 |
| Total | 149 | 159 | 144 | 149 | 151 | 164 | 916 | 100.00 |

In the next group of articles to which the report relates a somewhat higher scale of prices prevails. In tabulating the facts for the prices of a bedroom set of furniture of antique oak, consisting of three pieces,— bedstead, bureau, and wash-stand, the prices of which range from $100 to $15,— it was not necessary to use the cents column, as in only two quotations was a fraction of a dollar recorded — namely, one-half dollar. In other groups the same tendency is observable. It is only in the food group, where purchases are frequent and the range of prices comparatively small, that numbers not divisible by 5 play any considerable rôle. Thus the report gives in June, 1889, 298 quotations for eggs. The range of price is from 7 cents to 35 cents per dozen. In 175 cases quotations are in multiples of 5. This leaves 123, or 41.27 per cent, expressed in uneven numbers.

The quotations for other low-priced articles of household use, which are less frequently purchased, do not show so many figures not divisible by 5. Thus, in tin cups, which range from 2 cents to 10 cents each, 134 quotations out of 186 were at 5 cents and 22 of the remainder at 10 cents.

The inertia of retail prices, which is alluded to in the article of Dr. Jones, is well illustrated by the figures of this report. The report gives not only the retail prices of commodities, but also the wholesale prices for the period in question. We may compare the course of prices not only for "all articles," but also for eggs and butter, which show a seasonal variation, and coffee-pots, dinner-pails, and tin cups, which were affected by the change in tariff rates introduced by the Tariff Act of 1890.

In the twenty-eight months recorded the calculations of relative prices are based upon the average prices of the first three months of the series. The range of variation of all articles is at retail from 99.36 to 101.46, while at wholesale it is from 99.73 to 116.52. Of course, in this average many articles are included, and fluctuations tend to compensate. But a similar observation can be made in the calculation for individual commodities. For eggs the variation ranges at retail from 97.65 to 155.86, and at wholesale from 99.32 to 192.08. An analogous variation can be observed in the figures of butter, of the two grades given in the tables. So far as articles constructed of tin are concerned, the rise in prices which uniformly takes place in the latter part of the period is greater in wholesale prices than it is in retail prices.

The peculiar merit of the illustrations which we have given lies in the extent to which the investigation was carried, and the conditions under which it was instituted, which give us the highest guaranty that the facts recorded are correctly reported. Instances of the phenomenon which Dr. Jones has so ably discussed might be drawn from a wide variety of sources. It is hoped that the evidence herewith presented may serve to show how wide this range is. We hold it, moreover, to be important to distinguish correctly between such irregularities in statistical statement as arise from inaccurate reports, and those which represent an actual distribution of facts.

### *Remarks by L. G. Powers.*

I have been greatly interested in the paper of Dr. Jones. Round numbers meet the investigator of social phenomena everywhere. They do not prove the existence of a spirit that seeks to deceive; they do prove the fact that for the given case the party reporting does not conceive the subject of sufficient importance to take the

trouble to secure the exact facts for which he gives an estimate. The principle involved, leading to the use of an estimate where exact facts are supposed to be called for, can well be stated by a concrete case.

In the factory inspection department of the work of the Minnesota Bureau of Labor, accidents in factories are reported in accordance with a general provision of law. The law specifically requires certain information, such as the nature and extent of the injury and the circumstances attending the same. The blank return for accidents prepared by the Bureau also calls for the age of the injured. In the last four years 1289 accidents have been reported. They are quite full for most of the information called for by the statute. Most people see the use and value of such knowledge, and take great pains in reporting exact facts. But when they come to ages it is different. The employer reporting apprehends that the age is not an essential requisite of the report, and so, without taking great trouble, he estimates it as well as he can. In some cases he omits it altogether. Thus, out of the 1289, 425 did not have the age given. Of the others, the ages of those under 16 or 17 are given with reasonable exactness. The operation of the child-labor acts and kindred factors assists in furnishing the employer with the data at hand for exact information. But as we pass upward from 17 it is quite different. The farther we go until the age of 60 is reached, the more evidence is found of the use of round numbers, or, in other words, of estimates. This may be seen by the following tabulation of the 825 reported accidents : —

| Age. | Number. | Age. | Number. | Age. | Number. | Age. | Number. |
|---|---|---|---|---|---|---|---|
| 12 | 1 | 25 | **50** | 38 | 22 | 52 | 3 |
| 13 | 2 | 26 | 19 | 39 | 8 | 53 | 4 |
| 14 | 4 | 27 | 24 | 40 | **50** | 54 | 2 |
| 15 | 21 | 28 | 40 | 41 | 6 | 55 | **10** |
| 16 | 17 | 29 | 13 | 42 | 7 | 56 | 1 |
| 17 | 23 | 30 | **56** | 43 | 4 | 57 | 1 |
| 18 | 19 | 31 | 8 | 44 | 8 | 58 | 1 |
| 19 | 22 | 32 | 26 | 45 | **30** | 60 | 1 |
| 20 | 33 | 33 | 21 | 46 | 6 | 62 | 3 |
| 21 | 33 | 34 | 14 | 47 | 4 | 63 | 1 |
| 22 | 23 | 35 | **71** | 48 | 3 | 64 | 1 |
| 23 | 23 | 36 | 16 | 49 | 5 | .. | .. |
| 24 | 23 | 37 | 21 | 50 | **20** | .. | .. |

For the ordinary purposes of the Bureau of Labor, no attention is ever paid to these reports of ages. They are too indefinite, and partake too much of the nature of estimates. They are unreliable for specific years; they may, however, be made use of in a general way. Thus, if we combine the foregoing data by certain periods of years, the margin of error due to estimates is made quite small and may be disregarded. One such massing of the foregoing data is presented, to show how the error due to such estimates may sometimes be eliminated: —

| Ages of Persons. | Number of Accidents. | Ages of Persons. | Number of Accidents. |
|---|---|---|---|
| 11 to 15..... | 28 | 41 to 50..... | 93 |
| 16 to 20..... | 114 | 51 to 60..... | 23 |
| 21 to 30..... | 304 | Over 60..... | 5 |
| 31 to 40..... | 207 | Total..... | 824 |

When such reports as those referred to by Dr. Jones, with a liberal use of round numbers, can be condensed and used in a general manner, such as the foregoing, they may be relied upon to give fairly good results with only a small margin of probable error. When they cannot be thus massed, I individually have grave doubts concerning their value in the study of social phenomena.

### *Remarks by Mary Roberts Smith.*

A curious illustration of the way in which round numbers may affect prices in retail trade is found in the use of the "nickel" (five-cent piece) and the absence of pennies in California. One cannot buy here a single stick of candy, slate pencil, pair of shoe strings, a single spool of twist, package of pins, an orange or an apple, or even a single postal card or postage stamp (except in large post offices), but must always take five cents' worth. Many small articles denominated "dress-findings" cost five cents apiece here, which in New York would cost only two or three; and in the same way, articles which should cost five cents are ten cents apiece, or two for fifteen. The small buyer is thus always at a disadvantage. That this is recognized to some extent is shown in the case of a grocery, where, if one buys less than five cents' worth, a lead pencil is thrown in for change. Bankers also, in this country, credit themselves with the cents in accounts.

# REVIEWS AND NOTICES.

## HOFFMAN'S STATISTICAL STUDY OF THE NEGRO.

*Race Traits and Tendencies of the American Negro*, by Frederick L. Hoffman, *Publications of the American Economic Association*, Vol. XI, Nos. 1, 2, and 3, August, 1896.

This is the first attempt on the part of a competent statistician to deal with the vital and social statistics of the negro race in the United States. It is a most thorough and painstaking compilation. Mr. Hoffman divides his considerations into separate investigations under the heads Population, Vital Statistics, Anthropometry, Race Amalgamation, Social Conditions and Tendencies, and Economic Condition and Tendencies.

Concerning the first of these, dealing with Population, he reaches conclusions very different from those generally held by those who have discussed the subject on *a priori* grounds. The general impression has been that the colored population was increasing at a rate greater than that of the whites, owing both to the greater number of children born and also to the fact that all children of a mixed race were counted as blacks. From such a condition of affairs it would naturally be assumed that the race to which all half-breeds were credited would, especially if prolific, rapidly gain upon the other race. So firm a hold did this opinion have on many students of the subject that every one of them who estimated the future colored population from data obtained from the census has made an over-estimate, as compared with the number actually found by succeeding censuses. This is true from the time of Darby, who estimated in 1828 that by 1900 there would be a population of 25,825,878 blacks, to that of Professor Gilliam, who, within a few years, estimated that there would be 12,000,000. The census of 1890 showed the presence of only 7,470,040; and at the rate of growth since 1860, the population in 1900 will not be more than 8,500,000. According to the census of 1860, the colored population at that time amounted to 14.13 per cent of the entire population, while now it amounts to only 11.93 per cent, which may be partly accounted for by the cessation of negro

immigration and the large increase in white immigration. It is found, however, that during the same period the proportion of whites increased in seven out of thirteen southern states, while in the census period from 1880 to 1890 the proportion of colored persons to whites increased in only two southern states, Mississippi and Arkansas. Mr. Hoffman also demonstrates that this is neither due to the white immigration into these states, nor to any decided colored emigration. It is shown also that the native white population, in at least five states for which statistics exist, is increasing more rapidly than the native colored population.

The tendency of the negroes to migrate into the cities is observed. In the 14 largest cities of 10 southern states in 1860 only 18.85 per cent of the population was colored, while 36 per cent of the population in those states, at large, was colored. In 1890 these states contained 16 large cities with 29.08 per cent colored, while in the total population the total colored was 25.96 per cent. The increase of the proportion of the colored population in the cities is very much greater than that of the whites. In 1860, 11.67 per cent of the whites lived in these large cities, which percentage increased during 30 years to only 14.89 per cent. In 1860 but 4.82 per cent of the colored population was in these cities, which increased to 10.93 per cent in 1890. The migratory tendency was more pronounced during the last decade of the period than previously. In these cities, and especially in the cities of the north and west, as the author says, "the negroes are crowded into a very few wards," and these, "as a rule, are the most undesirable sections of the cities." In Chicago, for instance, 63.90 per cent lived in three wards which, at the same time, contained only 6.3 per cent of the white population. Mrs. Florence Kelly, factory inspector of Illinois, in the work entitled *Hull House Maps and Papers*, shows that "the section inhabited almost exclusively by colored persons is also the section which contains all the houses of ill-fame in this part of the city."

The author also shows that in many states the colored population in the country is actually decreasing, as, for instance, in Missouri in 74 out of 115 counties, from 1880 to 1890.

Under the head of Vital Statistics it is argued that, while probably the birth rate is higher among the negroes than among the whites, the mortality is so much higher as to more than offset the higher birth

rate. The author, for instance, shows that in Alabama, where the negroes have been supposed to be especially prolific, the ratio of births to deaths among the whites has been 2.96 to one, while among the negroes it has been but 2.06 to one. He finds that in Rhode Island, Connecticut, and Massachusetts the deaths among the colored population had exceeded the births. He finds that the death rate in 10 cities of the south has averaged 20.12 per cent among the whites and 32.61 among the negroes. He also makes comparison of the death rate at various age groups among whites and negroes in the six cities of New York, Brooklyn, Boston, Philadelphia, Baltimore, and Washington, showing that the excess of mortality on the part of the colored race exists at practically all ages. The difference is enormous at ages under 15. It is also found upon closer examination that the mortality before completion of the first year, and also at ages one to five, is much greater among the negroes than among the whites. In Richmond, for instance, over one-half of the negro children die under one year of age.

It is very frequently assumed that the higher mortality among the negroes is owing to unsanitary environment. It is found, however, that the unfavorable mortality on the part of the colored population persists in the cities of Washington and Baltimore, without regard either to the altitude above sea level or the density of the population.

Mr. Hoffman makes a very thorough investigation of the question whether the negro mortality has been increasing or decreasing since the liberation of the slaves. He finds that negro mortality has, at least, not diminished, and has probably increased in most southern cities, while there has been a large decrease in white mortality. He gives a very interesting table of comparative expectations of life for whites and negroes in four southern cities, according to the census of 1880. This shows an average expectation of from 38 to 42 years for whites, and from 22 to 25 years for negroes, calculated from birth.

As to the causes of excessive mortality he finds that there are from 50 to 100 per cent more premature births than among the whites, and about twice the number of deaths under one year of age from debility. Intestinal diseases carry off also nearly twice as many under the age of five. He also finds that, while consumption has been decreasing in fatality among the whites, it has been rapidly increasing among the negroes. This is contrary to the accepted opinion, but it is sus-

tained by such a mass of statistics, scarcely contradictory in a single instance, that there seems to be no excuse to dispute the conclusion. He finds that during the war the mortality among whites was 53.48 per thousand, while among the negroes the rate was 143.40. Consumption carried off nearly three times as large a proportion of the colored troops as of the whites. Similar statistics have been obtained from the West Indies and other localities where blacks abound. Statistics taken from the census of 1890 for 14 American cities show a similar disproportion of deaths by consumption among the negroes. This is the case at all ages. A similar predisposition toward pneumonia is also found, the mortality ranging from two to more than four times as great as that among the whites. Scrofula and venereal diseases are also very much more common and more fatal, a condition of affairs which has practically grown up since the war.

The author believes that the general presumption that the negroes are comparatively immune from malarial diseases is a mistake. The evidence that this ever was the case is very slight and by no means conclusive. It certainly is no longer the case. During the war it was found that these fevers were much more prevalent among the negroes than among the whites. Statistics now prove beyond question that the death rate among the blacks because of malarial and typhoid fevers is much higher than among the whites. A comparative immunity against yellow fever is conceded to have existed and also to exist at present, but probably in a less degree. No immunity from small-pox is discoverable, but the death rate from this disease is not large enough to greatly influence the mortality. There is no doubt that the negro children are less subject to measles, scarlet fever, diphtheria, and croup. Deaths from diseases attending child-birth are about the same in the two races, except as to puerperal disorders, where the negro death rate is very high, owing to want of cleanliness and proper medical attendance. An investigation as to the mortality by cancer is not conclusive. Alcoholism, which was at one time decidedly less prevalent among the negroes than among the whites, appears now to have increased until it is both more prevalent and more fatal. This is indicated also by an excessive mortality from liver diseases among negroes under 45. The connection between liver diseases and the use of alcohol is well known. Insanity is said to be less prevalent among the negroes than among the whites, and

also to be decreasing in both races. Mortality among the colored insane, however, is said to be higher than among whites. Suicide is found to be very rare among the negroes. As the author states, "The general conclusion is that the negro is subject to a higher mortality at all ages, but especially so at the early age periods."

Under the head of Anthropometry the author gives an interesting series of statistics, showing that, notwithstanding this tendency toward consumption and respiratory difficulties, the negro is on the average heavier in proportion to his height than the white. From data obtained from measurement of recruits for the United States army it was found that, while the negro showed an average chest expansion as good or better than the whites, in the civil war period, the colored troops at this time show decidedly less expansion. It has also been demonstrated that the lung capacity of the negro in proportion to height is considerably less than that of the whites. This is also indicated by the fact that the blacks on an average show a higher number of respirations per minute than do the whites.

Under the head of Race Amalgamation we find the theory, so often put forth, that the negro is being elevated to a higher type by such amalgamation, completely overthrown. The author, after an examination of others' theories, shows, first, that the tendency of the race is not toward amalgamation by lawful marriage, which is evidenced primarily by the congregation of the negroes in the worst sections of the cities; and, second, that intermarriages in a number of states for which statistics exist have not increased. This is also true for Bermuda and the West Indies. On the contrary, he discovers that, while illegitimate births among the whites have not increased, in Washington, D. C., for example, they have increased among the blacks from 17.06 per cent to 26.05 per cent in only five years, and now stand at ten times the percentage of illegitimacy among the whites. He also reports the result of a careful investigation on his own part of 37 mixed marriages, eight being white men living with colored women, and 29 white women living with colored men. Of these he finds but one in which there is clear proof that the marriage was fairly successful. Most of them were unions of people of grossly criminal or immoral character.

The author discusses the statistics of religion, education, crime, pauperism, and immorality under the head of Social Conditions and

Tendencies. He shows that a very large proportion of the negro population are members of Christian churches, there being, according to the census of 1890, 2,673,977 communicants, of which more than one-half are Baptists. Most of the others are Methodists. There is one communicant to every 2.79 per cent of the negro population, while among the whites there is but one to every 3.04 per cent. There has been a much larger increase in attendance of colored pupils at school than in the attendance of whites, and now about the same percentage of negro children of school age attend school as of whites. There are a large number of institutions for higher education which are liberally attended.

The proportion of negro criminals to the entire number of criminals is stated to be 29.38 per cent, while the proportion of negro population was but 10.20 per cent for males. The disproportion of colored persons among those charged with crimes against the person is still greater, being 38.21 per cent for men and 56.10 per cent for women. The author finds that nearly 41 per cent of those convicted of rape were negroes, and nearly 40 per cent of those convicted for assault. In the penitentiaries of Pennsylvania, in 1894, 16.61 per cent of the males were black, and 34.61 per cent of the females, while but little over 2 per cent of the population, were black. A similar disproportion is discovered in New Jersey and in other states and cities. Data from police reports show that, with but 1.3 per cent of the total population in several large cities, the negroes have contributed 9.8 per cent to the total arrests. No other race in the table contributes anything like such a disproportion. As an illustration of the low morality existing among the negroes the statistics of illegitimacy in Washington are again quoted, as also the statistics of Mobile and Knoxville, fortified with those of Jamaica. Pauperism is also found to be more common among the negroes than among the whites.

The comparative value of the negro as a productive laborer is discussed under the head of Economic Condition and Tendencies. It is found that, so far as farm labor is concerned, especially in the production of tobacco, rice, and cotton, the negroes are not proving as valuable and productive as under the system of slavery. It is also fairly demonstrated that they are not as good laborers as whites. There is likewise little, if any, evidence of improvement. The necessity for constant supervision of negro laborers is considered a grave draw-

back to their efficiency. The weight of evidence seems to be that the education of the negro up to the present time has not increased his value as a laborer, nor induced him to enter, with fair prospects for success, occupations requiring skilled labor. As a result of his comparative inefficiency, he commands but about 80 per cent of the wages given whites working in the same capacity. Proprietors of mills and factories in the south do not pronounce favorable opinions as to the employment of negroes. Even in northern cities, where abundant opportunities are given, it is found that, outside of domestic employment and the quasi-domestic employments of barbers, coachmen, hostlers, and waiters, comparatively few engage at skilled labor. A comparison with the Indians living on New York reservations is decidedly favorable to the Indians. Such statistics as are available on the subject of the accumulation of property by the negroes do not indicate that they are gaining at a very rapid rate. The assessed valuation per capita of their property ranges from one-twentieth to one-fortieth of the assessed valuation of property held by whites. There is evidence, however, that they are gradually increasing their holdings of farms, as evidenced by acreage instead of value, in some states.

The conclusion of the author, from the statistics before him, and also from the analogies of other inferior races which have come in contact with the whites, is "that the tendencies of the colored race are now downward and toward extinction, and can only be arrested by radical and far-reaching changes in their moral nature."

MILES MENANDER DAWSON.

## INFANT MORTALITY IN PRUSSIA.

*Kindersterblichkeit sozialer Bevölkerungsgruppen insbesondere im preussischen Staate und seiner Provinzen.* In *Beiträge zur Geschichte der Bevölkerung in Deutschland seit dem Anfange dieses Jahrhunderts.* By Dr. Seutemann. Tübingen, 1894.

In 1877 the Prussian Statistical Bureau further improved their valuable registration methods by regularly classifying statistical data of births and deaths according to social classes, and the results for infant mortality are embodied in this valuable work. About one-

third of the report is devoted to a review of earlier publications upon the same subject.

The statistics of cities had been already examined to illustrate the differences in infant mortality in different localities, and its distribution according to density was recognized. There were also some early attempts to compare infant mortality in various social classes. The first probably was made in 1830 by Chateauneuf (*De la durée de la vie chez le riche et chez le pauvre.—Ann. d'Hygiène publique*, Tome III; 1830). Caspar, in 1835, in a similar work, argued that out of 1000 deaths of infants under 5 years of age 57 belonged to the nobility and 345 to the occupants of almshouses. Later statisticians examined infant mortality rates in cities in connection with the calling or trade of the mother and father.

Thus Seutemann undertook this work after its foundations had been well laid by others. It was known that deaths of infants vary according to density of population, occupation, income, and, to a certain extent, according to social classes, although the latter relation was known only for the cities. It remained for Seutemann to examine the class relations more in detail, and to show these relations for city and country.

The Prussian population is divided according to six chief social classes: —

1. The independent in property, calling, or business. (*Selbstständigen.*)
2. Public employees not subject to removal, such as civil employees, including postal and railroad officials. (*Staats- und Gemeindebeamten.*)
3. Those occupying positions requiring intelligence but who are subject to removal, including private officials and private employees. (*Privatbeamten.*)
4. Wage-earners with regular employment, such as journeymen, assistants, operatives, apprentices, etc. (*Gesellen, Gehilfen, Fabrikarbeiter.*)
5. Wage-earners without regular employment, such as day-laborers, temporarily hired servants, etc. (*Tagelöhner.*)
6. The class of domestics (*Dienstbosen*) and servants (*Gesinde*).

Added to these are three minor classes, as follows: —

7. Members of the standing army, navy, and police.
8. Private gentlemen (*Rentners*) and pensioners.
9. Public almshouse occupants.

Seutemann examines each of these several classes in detail and compares them with each other as follows: —

A. *Servants* (*Gesinde*).—The *Gesinde* or menials, although a part of the class of hired servants, nevertheless offer certain well-marked and noteworthy characteristics. Infant mortality is greater in this class than in any other.

| | |
|---|---|
| Almshouse people, . . . . . | 42.15 per cent die under one year. |
| Menials (Class 6), . . . . . | 33.19 " " " " " " |
| Day-laborers (Class 5), . . . | 25.12 " " " " " " |
| Gehilfen (Class 4), . . . . . | 22.84 " " " " " " |
| Independent (Class 1), . . . . | 21.59 " " " " " " |
| Private officials (Class 3), . . | 21.11 " " " " " " |
| Public officials (Class 2), . . . | 20.31 " " " " " " |

The servant class, here represented as having the highest rate of infant mortality, has also about one-fifteenth of all the births. The cause of this high rate is worthy of careful investigation. Seutemann sees this cause in the high rate of illegitimate children, the number of married menials of the male sex being very small. Furthermore, "if the number of married serving people were doubled and tripled they would still be in no true proportion to the number of births that are registered in the *Gesindeklasse*." He estimates the illegitimate births at six-tenths and the legitimate births at four-tenths of all births, and as the mortality among illegitimates is always excessive he maintains this to be the main cause of the high infant mortality in the group. There is also a great difference in the rates of infant mortality between city and country districts for legitimates of this class, as well as for all illegitimates.

It is worthy of notice that the mortality rate of all the children of this class is greater in the city districts than the mortality rate of all illegitimates. This is particularly true in the lower provinces, where the percentage of illegitimates is excessive. Cities of East and West Prussia, Pomerania, Posen, and Schleswig-Holstein had in 1876, to every legitimate birth in the class of menials, 18.5, 16.5, 8, and 12.5 illegitimate births, respectively, while in the cities of Westphalia and Rhineland provinces the proportions were 1 to 3.5, and 2.5, respectively.

B. *Wage-Earners without Regular Employment, Day-Laborers, etc.* (*Tagelöhner*), *and the Class of Wage-Earners with Regular Employment* (*Gesellen, Gehilfen*).—The proportion of infant mortality in the classes here considered are 25.12 and 22.84 per cent, respectively. In the class of *Privatbeamten* the percentage is 21.11, and in the class

of *Selbstständigen* 21.59. The higher rate for the working classes is supposedly due to the industrial activity of the wife; here also there is an inconsiderable number of illegitimate births. Still another reason for high infant mortality in this class is the relatively high birth rate, and, as Westergaard has shown for Copenhagen, the percentage of infant mortality for different-sized families is, in families with from 1 to 4 children, 22.6 per cent; from 5 to 8, 30.2 per cent; and from 9 to 12, 49.5 per cent. Absence of psychological restraints and the early age of marriage also tend to give the same results. An interesting comparison shows the percentage in different social groups for different ages. It is to be expected that in the more intelligent classes we should find more marriages among the older people.

| Number of Years Married. | 1st Group.* (Higher Classes.) | 2nd Group. (Hand Workers.) | 3rd Group. (Clerks.) | 4th Group. (Domestics.) | 5th Group. (Laborers.) |
|---|---|---|---|---|---|
| | *Per Cent.* | *Per Cent.* | *Per Cent.* | *Per Cent.* | *Per Cent.* |
| Less than 5... | 17.6 | 22.2 | 31.6 | 30.1 | 34.2 |
| 5 to 9..... | 17.4 | 20.2 | 19.8 | 19.4 | 23.7 |
| 10 to 14..... | 15.2 | 16.4 | 15.2 | 14.6 | 14.7 |
| 15 to 24..... | 25.5 | 22.8 | 18.7 | 19.5 | 18.3 |
| 25 and more.. | 24.3 | 18.4 | 14.7 | 16.4 | 9.1 |
| | 100.0 | 100.0 | 100.0 | 100.0 | 100.0 |

The obvious deduction is that in the marriages among the younger people we should expect greater fertility, and therefore greater infant mortality, as shown in these mortality percentages: —

| | Under 5 Years. | 5–9 Years. | 10–14 Years. | 15–24 Years. | 25 Years and Over. |
|---|---|---|---|---|---|
| 1st Group..... | 0.99 | 2.59 | 3.70 | 4.24 | 4.80 |
| 2nd " ..... | 1.11 | 2.52 | 3.51 | 4.32 | 4.91 |
| 3rd " ..... | 0.92 | 2.27 | 3.23 | 3.77 | 4.35 |
| 4th " ..... | 1.11 | 2.46 | 3.28 | 4.13 | 4.70 |
| 5th " ..... | 1.27 | 2.76 | 3.83 | 4.79 | 5.26 |

There is, furthermore, a difference between the infant mortality rates of the classes 5 and 4, the latter being considered the more intelligent group.

C. *The Class of Independents* (*Selbstständigen*).— In both city and country the infant mortality among this class is less, although the difference between it and Class 4 is not very great, and varies in

* The "groups" here are not exactly equivalent to the six original social divisions.

different periods. The variations in the infant mortality in the class of wage-earners can be explained only by variations and changes in the general economic welfare, whereas infant mortality among the Independents remains about the same from period to period. The following table shows these differences: —

PERCENTAGE OF INFANT MORTALITY TO 100 BIRTHS.

| | 1877–79. | 1880–82. | 1883–85. | 1886–88. |
|---|---|---|---|---|
| Gehilfen (Class 4) | 21.95 | 22.81 | 23.21 | 22.52 |
| Day-laborers (Class 5) | 24.02 | 24.81 | 25.53 | 25.01 |
| Menials (Class 6) | 32.91 | 33.10 | 33.63 | 32.85 |
| Independents (Class 1) | 21.38 | 21.47 | 21.94 | 21.35 |
| Rentners (Class 8) | 22.99 | 24.31 | 24.46 | 23.99 |
| Private officials (Class 3) | 21.78 | 21.15 | 21.23 | 20.95 |
| Public officials (Class 2) | 20.31 | 20.75 | 20.53 | 19.72 |
| Military (Class 7) | 19.73 | 20.13 | 19.77 | 18.21 |

Seutemann concludes that infant mortality increased to a considerable extent in consequence of the "hard times" of 1880–85. The independent class did not suffer by this to any great extent,— a phenomenon which he explains by the fact that the crisis of 1880 was primarily a relaxation of the spirit of enterprise and a loss of confidence accompanied by great reductions in wholesale prices. The necessary result was lessened demand for labor, reduction in wages, and loss of work. On the other hand, retail prices were not much affected, so that the smaller merchants and retail dealers or, largely, the class of independents, were not much harmed.

City and country life in the various Prussian provinces show numerous variations in the relations of this class to the group of wage-earners. Saxony and the Rhine provinces show interesting deviations from the rule, for here, both in the country and city regions, the infant mortality is greater in the class of the independents.

In these provinces the industries are more numerous than in the rest of Prussia. This difference does not hold for all densely settled districts, however, notably in Westphalia, Schlesia, and Berlin, but in the less industrial parts of Prussia the conditions are widely in favor of the independents.

D. *Rentners, Pensioners, etc.* — This class cannot be distinctly separated from the preceding, but the infant mortality in this group is very different from that of the class of independents. The mortality of infants is here so great that it resembles that of the day wage-

earners (Class 5). The rate for this class in the entire state is 24.24 per cent, which is above the average for all callings and classes (23.95). This condition is borne out in all the provinces almost without exception.

The country districts show a greater infant mortality than the cities in this class. The cause of the excessive mortality is supposed by Seutemann to be the older age of the parents. Another significant fact is the proportion of boys to girls. The rate of boys born in the rentner class is greater than that for any other class, and infant mortality among boys is higher than among girls.

E. *Officials* (*Privatbeamten, Gemeindebeamten, etc.*).— This class represents a much higher grade in the social scale. Their relations to labor, to daily bread, etc., are widely different from those of the class of wage-earners, and we find a corresponding difference in the rate of infant mortality.

In cities the differences are not so great, but in the country districts the mortality rates are more favorable. In cities the mortality may even be greater than among wage-earners. The total number of children born in this group is not very large. The mortality among children of public officials in the country regions, however, is comparatively high, while for private officials it is very low. A distinction can also be drawn between military and public and private officials.

Seutemann concludes with a general consideration of infant mortality by classes in the different portions of the country.

INFANT MORTALITY IN PERCENTAGE OF TOTAL BORN.

| | Whole Population. | Domestics. | Day Laborers. | Gehilfen. | Private Officials. | Public Officials. | Military. | Land Tax per Capita. (Marks.) |
|---|---|---|---|---|---|---|---|---|
| Berlin | 30.26 | 36.76 | 37.11 | 28.44 | 23.35 | 22.29 | 16.62 | .... |
| Schlesia | 29.18 | 35.47 | 28.10 | 29.78 | 25.42 | 24.58 | 21.96 | 2.40 |
| Brandenburg | 27.72 | 33.54 | 29.21 | 27.06 | 23.34 | 23.44 | 20.26 | 3.49 |
| West Prussia | 26.23 | 40.28 | 25.91 | 25.41 | 22.45 | 22.19 | 20.28 | 2.42 |
| Posen | 25.07 | 33.42 | 24.92 | 22.93 | 21.36 | 21.88 | 22.12 | 1.97 |
| East Prussia | 24.99 | 33.74 | 24.99 | 23.92 | 21.38 | 20.50 | 22.86 | 2.09 |
| Saxony | 24.79 | 33.12 | 27.07 | 22.55 | 22.43 | 20.80 | 18.44 | 5.43 |
| Pomerania | 23.08 | 29.07 | 22.67 | 23.18 | 19.51 | 21.41 | 22.40 | 2.75 |
| Rhineland | 21.60 | 35.05 | 23.53 | 20.44 | 19.32 | 19.35 | 19.40 | 3.80 |
| Hessia | 18.83 | 28.24 | 20.87 | 17.92 | 17.53 | 16.11 | 15.67 | 3.22 |
| Schleswig-Holstein | 18.39 | 28.27 | 18.25 | 19.37 | 17.19 | 14.64 | 14.96 | 7.09 |
| Hannover | 18.20 | 24.44 | 18.26 | 18.21 | 16.42 | 15.86 | 16.10 | 4.69 |
| Westphalia | 17.79 | 23.00 | 18.28 | 17.88 | 16.62 | 16.52 | 16.19 | 3.71 |

Here, from class to class, a decrease can be noted. The several regions are differently situated economically. In many there is a higher standard of life and of living, which would explain the differences among the same class in different regions. Economic well-being in the several regions can be roughly shown by the last column, representing the direct state tax *per capita*. The higher tax rate represents here, in a rough way, higher wages, higher holdings, and a corresponding higher standard of life.

The author sums up as follows: "As a result of these considerations, it appears that all classes have shared the differences in infant mortality in the different provinces. The reason lies in the circumstance that the social character of a region influences and acts upon the standard of life in all gradations of society in such a way as to raise or lower the rate of mortality. If the average income is taken into consideration with the social distinctions, one can compare more satisfactorily the standard of life in different regions. But the different social character of a region itself creates important differences, for a great economic development affects not only the standard of life of the population, but with it comes also a higher culture, although not always in true proportion. Public improvements are more frequent in countries of wealth. Schools and other public institutions increase the intelligence and morality of the population, and thus affect the infant mortality. Public hygiene especially operates to prevent the increase of mortality, and has been the cause of effective decrease."

GARY N. CALKINS.

## INEBRIETY AND SUICIDE.

*Trunksucht und Selbstmord und deren gegenseitige Beziehungen nebst einem statistischen Anhang und 2 Karten.* By Dr. F. Prinzing. Leipzig, 1895.

This is a very carefully prepared treatise dealing chiefly with the phenomena of inebriety and suicide in Europe. The writer has gone into great detail, has adopted a broad and liberal point of view, and handled his material with considerable discrimination and caution.

The first chapter deals with inebriety in general,— its causes and results. The author maintains that spirituous liquors have their

legitimate use in society; that it is their abuse which causes all the evils of intemperance; and that this fact must be recognized if any permanent good is to be accomplished. The physical consequences of intemperance are diseases of the heart, stomach, liver, and kidneys, which are extremely difficult of cure, and apt to cause melancholy and depression. Mentally it renders impossible any consistent and long continued brain work, and morally it destroys all feelings of self-respect and responsibility.

The second, third, and fourth chapters take up suicide, its underlying causes, and the motives directly leading up to it. The resolution to suicide requires more intelligence than savages possess, but among civilized peoples self-murder has always been more or less common. In ancient Greece, among the early Romans, and in the religious period of the Middle Ages, it was regarded as an immoral act; but in the corrupt times of the Roman Empire, and among certain classes during the eighteenth century, suicide was considered a rather commendable deed. The Christian and Mohammedan religions strictly forbid it, but Buddhism sanctions it.

The increase of suicide in this century led to a careful investigation of the subject. The chief causes are found to be, in Asiatic countries, religious fascination and excess of population; and in Europe and America, grief over loss of fortune, inebriety, domestic troubles, mental disorder, and "tired of life," the last chiefly among old people. The best statistics on the subject were taken in Prussia, covering the years 1883–90. In that time 47,182 suicides were recorded, or an average of 5897.7 per year, and of these 26 per cent were from mental disorder, 10.8 per cent from grief over business losses, 9.9 per cent from being "tired of life," 9.7 per cent intemperance, 8.5 per cent bodily diseases, 8.1 per cent remorse and fear of punishment, 8.5 per cent from miscellaneous reasons, and 18.5 per cent from unknown causes. It is very difficult to trace the ultimate cause in each case, but probably 25 per cent was attributable to inebriety. As to sex, only 25.6 per cent were of women. The largest number of suicides occur among the commercial classes, owing to the increased pressure of modern life causing more failures and more mental disorder among the educated.

In order to ascertain the moral meaning of suicide it is necessary to distinguish two classes of subjects: (1) Those suffering from mental

disorder, or the social suicides; and (2) those apparently sound in mind, or the tragic suicides.

The fifth chapter deals with the relation between inebriety and suicide. In 1825, Casper, the first to make a careful inquiry into this subject, found that out of a large number of cases 24.7 per cent were caused by inebriety. By careful inquiry since then it has been ascertained that, with a few exceptions, the amount of spirituous liquors consumed in a country corresponds very closely to the number of suicides occurring there, as the following table shows: —

| Country. | Consumption, in Litres, per Capita. | | | | Number of Suicides in Every Million of Inhabitants. |
|---|---|---|---|---|---|
| | Year. | Wine. | Beer. | Spirituous Liquors. | |
| Denmark | 1890 | 1 | 102.9 | 6.2 | 257 |
| Switzerland | 1891 | 61 | 40.0 | 3.2 | 220 |
| France | 1883-87 | 94 | 22.5 | 3.8 | 210 |
| German Empire | 1891 | 6 | 105.8 | 4.4 | 207 |
| Austria-Hungary | 1892 | 22 | 32.0 | 4.3 | 163 |
| Belgium | 1889 | 3 | 177.5 | 4.4 | 114 |
| Sweden | 1889 | 1 | 27.2 | 3.2 | 107 |
| Great Britain | 1882-84 | 2 | 136.2 | 2.7 | 78* |
| Norway | 1891 | 1 | 37.5 | 1.8 | 66 |
| Holland | 1888-92 | 2 | 34.0 | 4.5 | 52 |
| Italy | 1884 | 95 | 0.9 | 1.4 | 47 |
| Finland | 1888 | .. | .... | 2.1 | 41 |
| Russia | 1886 | 3 | 4.6 | 3.4? | 29? |

* Only England and Wales.

The sixth and last chapter, although brief, contains several important suggestions as to the most effective means of decreasing both inebriety and suicide. It would be a great help if literature, the press, and the theatre, instead of exercising pernicious influence, as is now too often the case, would pay proper attention and deference to the religious beliefs of the people. The best protection against thoughts of suicide is a harmonious development of character, and the place to attain this is in the schools, although it is often neglected there.

Social suicides can undoubtedly be decreased by better care of the poor. Intemperance can be most effectually dealt with by placing a proper tax on the sale of spirituous liquors, limiting as far as possible the places where they may be obtained, and forcing persons having

the drink habit to go to asylums. But, after all, laws and police regulations can be of only secondary importance, and radical improvement can only be reached when the people — the lower as well as the higher classes — learn to recognize the danger and shame of drunkenness.

The value of the work is further greatly increased by an appendix containing nine tables of statistics and two colored charts. The first seven tables relate to suicide, its causes and modifying conditions as developed in Prussia in 1883–90. Table VIII gives the causes of suicide in Bavaria from 1884 to 1891, and Table IX the same for Würtemberg from 1873 to 1890. Chart I illustrates the prevalence of suicides in the States and provinces of Germany, and Chart II the consumption of spirituous liquors in the same, showing by comparison the striking connection existing between the two.

A. T. Hosmer.

## THE GAIN AND LOSS EXHIBIT OF INSURANCE COMPANIES.

Prior to January 1, 1896, the various State insurance departments of the United States had not required the life insurance companies to make a report of the items of profit and loss for the year, so as to show the source of all gains and the cause of all losses. In the convention of State insurance officials during 1895 a new blank, on which a committee had been working for more than two years, was adopted unanimously. This blank contains, in addition to the things formerly required, a specific and detailed statement of items of profit and loss for the year. Though there was no objection to this in the convention, there was serious and combined objection on the part of life insurance companies before the same came actually into use. As a consequence of this objection, all of the departments except four failed to carry out the will of the convention; that is to say, they failed to require the companies to fill out this part of the blank report. The four departments which insisted upon compliance with this requirement were those of Connecticut, Wisconsin, Illinois, and Colorado. The department of Connecticut, being limited as to the time at which its report must appear, found its data so incomplete that it published only aggregates, and did not publish the individual

statements of companies. The other three departments have published the statements as received from the companies; and, especially in the report of the Illinois department, will be found very nearly accurate information concerning the gains and losses of 41 American companies.

This is the most important step in the direction of obtaining valuable and pertinent statistics concerning the operations of life insurance companies that has yet been taken. Since the requirement, if enforced by but one department, will continue to furnish us with these statistics, we may feel a considerable degree of confidence that they will be hereafter furnished. This is the more true in view of the fact that Commissioner Betts, of Connecticut, holds over, and that the other three commissioners are candidates for re-election or reappointment, each with almost certain prospects of retaining office. The information contained in these reports, which is of the greatest importance, consists of four comparisons of two items each. One is a comparison of the actual losses by death with the losses expected according to the standard tables by which the liabilities are computed; of expenses with the aggregate loading upon premiums intended, partly at least, to cover expenses; of interest actually earned with the interest required to make good the reserves; and of the surrender values allowed for discontinued policies with the reserves forfeited upon discontinuance.

All American companies which sell insurance on the participating plan make use of the famous contribution system of dividing surplus. This system consists in giving to each policy its own share of the surplus, contributed under the three heads, of salvage on mortality, salvage on loading, and surplus interest in excess of that required to make good the reserve. To this is commonly added, and always should be added, an equitable proportion of the gains from forfeitures and surrenders. Consequently the most important subjects of inquiry in connection with gains or losses in life insurance companies are comprised under these four heads. None of the four departments which required the gain and loss exhibit have tabulated these items or reduced them to percentages, so as to make a ready comparison possible. The *United States Review*, an insurance journal of Philadelphia, has, however, done so.

MILES MENANDER DAWSON.

## NOTES ON VITAL STATISTICS.

*Statistics of the Colony of New Zealand for the Year 1894, with Abstracts of the Agricultural Statistics of February, 1895, and Statistics of Local Governing Bodies for the Year Ended March 31, 1895.* Compiled in the Registrar-General's Office from Official Records. Wellington, 1895. Pp. xiv, 469.

The population of New Zealand, estimated on December 31, 1894, was 728,121, or exclusive of Maoris was 686,128. The method of estimation, as in the other Australasian colonies, is by adding the total net increase, or excess of births and immigrants over deaths and emigrants, to the population as given by the last census, and continuing this process from year to year. Immigration was larger for 1894 than for any year of the decennium 1885–94, with the exception of 1893, but emigration also considerably exceeded the average. The net result was the addition of only 2253 persons to the population of the colony. In 1893 the net gain was 10,412 persons.

The following decennial statement shows the vital rates of New Zealand per 1000 estimated mean population, and compares the rates for the other colonies during the last year of registration: —

RATES PER 1000 POPULATION.

| New Zealand. | Births. | Marriages. | Deaths. |
|---|---|---|---|
| 1885 | 34.35 | 6.65 | 10.61 |
| 1886 | 33.15 | 5.99 | 10.54 |
| 1887 | 32.09 | 5.97 | 10.29 |
| 1888 | 31.22 | 5.97 | 9.43 |
| 1889 | 30.17 | 5.94 | 9.44 |
| 1890 | 29.41 | 6.12 | 9.66 |
| 1891 | 29.01 | 6.04 | 10.35 |
| 1892 | 27.83 | 6.23 | 10.06 |
| 1893 | 27.50 | 6.22 | 10.23 |
| 1894 | 27.28 | 6.15 | 10.19 |
| **Year 1894.** | | | |
| Queensland | 31.86 | 5.70 | 12.08 |
| New South Wales | 31.48 | 6.20 | 12.30 |
| Victoria | 29.16 | 5.98 | 13.13 |
| South Australia | 30.49 | 6.09 | 11.64 |
| Western Australia | 27.49 | 6.24 | 14.00 |
| Tasmania | 31.11 | 5.42 | 12.42 |

New Zealand is seen to have the lowest birth rate of any of the colonies for the year. The birth rate, moreover, shows a steady and

fairly uniform decline through the decennium, similar to the corresponding decline observed in the birth rates of the United States and Europe during recent years. The marriage rates are singularly low for a new country, but show rather an increasing than a diminishing frequency in late years. Tasmania had the lowest rate of the seven colonies in 1894. New Zealand had distinctly the lowest death rate of any of the colonies in 1894, and this has usually been the case in previous years. The other colonies, however, have generally shown a considerable decrease in the registered death rates during the ten-year period, while the mortality of New Zealand varied only slightly. It may be noted that all of these death rates are much below those of European countries, or of any states in this country whose registration is accepted as accurate.

The largest number of deaths, 233, and the highest death rate recorded, 34.3 per 100,000 population, from influenza, occurred in 1894; those for 1891, 210 and 33.3, respectively, had previously marked the maximum of the late epidemic. Measles, which caused 525 deaths in 1893, and none in the preceding year, abruptly declined to 14; scarlet fever remained very low, diphtheria decreased, while whooping cough rose from 55 deaths in 1893 to 190 in 1894. The rise in the mortality from cancer, noticeable in the vital statistics of Europe and America, is evident, the increase from 1893 (332 deaths) to 1894 (408 deaths) being unusually abrupt.

CRESSY L. WILBUR.

*Cape of Good Hope. Reports on the Public Health for the Year 1894, including the Report of the Acting Medical Officer of Health for the Colony, together with Reports of District Surgeons, Medical Officers, Medical Inspectors, and Local Authorities.* Cape Town, 1895. Pp. cxxxviii, 242.

Cape Colony has heretofore remained an exception to the general rule that the British colonies have excellent systems of vital registration. It is especially gratifying, therefore, to note that under the "Births and Deaths Registration Act, 1894," promulgated in August of that year, we are likely to have accurate vital statistics of that colony.

The following table shows the death rates from typhoid fever and from diphtheria: —

DEATH RATES PER 100,000 POPULATION, 1894.

| Locality. | Typhoid Fever. | Diphtheria.* |
|---|---|---|
| Port Elizabeth | 34.3 | ..... |
| Uitenhage | 75.0 | ..... |
| Cape Town | 82.1 | 80.4 |
| King William's Town | 96.9 | 83.0 |
| Worcester | .... | 92.5 |
| Malmesbury | ..... | 162.5 |
| Calitzdorp | 302.7 | ..... |
| Burghersdorp | 334.4 | ..... |
| Willowmore | 362.3 | ..... |
| Beaufort West | 429.9 | 179.1 |
| Murraysburg | ..... | 382.8 |
| Aberdeen | ..... | 398.4 |
| Richmond | 566.3 | ..... |
| Sutherland | 731.7 | ..... |
| England and Wales, 1893 | 22.9 | 31.8 |
| London, 1893 | 16.1 | 76.0 |

* Rates for "diphtheria and membraneous croup" for the colony.

Small-pox prevailed quite extensively during the year, there being 229 separate outbreaks, 1900 cases, and 110 deaths. Interesting statistics and arguments are given in regard to the efficacy of the law for the restriction of venereal diseases passed in 1885, and under which the proportion of women found to be diseased by medical examination has largely decreased. Leprosy is stated to be decidedly upon the decline, so far as the colony proper is concerned.

The Cape of Good Hope would seem to be an excellent field for the application of modern methods of restriction and prevention of the communicable diseases, and, judging from the practical use made of bacteriological analysis and serum therapy in the diagnosis and treatment of diphtheria, the active measures used to combat small-pox, and the successful working of the Contagious Diseases Prevention Act, the health service is alive to its opportunities. The appearance of the First Registration Report will therefore be welcomed with a great deal of interest, and in the successive annual issues the exact figures illustrative of the efforts of sanitary science to ameliorate the present excessive mortality will continue to receive careful attention from all workers for public health.

CRESSY L. WILBUR.

Lansing, Mich.

*Mariages, Naissances et Décès en Suisse de 1871 à 1890. Publié par le Bureau de Statistique du Département Fédéral de l'Intériéur.* Berne, 1895.

This publication constitutes the 103d number of the valuable series of documents issued by the Swiss Bureau of Statistics. The observations are comprised in the first forty-six pages. The introductory portion treats of the general subject of the Swiss vital statistics, and recounts some of the difficulties in securing uniform methods throughout the different cantons.

One of the commendable features of this document is the adoption of clear and definite standards of comparison. For this purpose the standards for marriages are the total population, and the numbers of unmarried men and women of marriageable ages. For divorces the standard is the number of existing married couples (a much better standard of comparison than the annual number of marriages). The marriages in Switzerland for the twenty-years period (1871–90) were as follows: —

| | | | |
|---|---|---|---|
| 1871, | 19,514 | 1881, | 19,425 |
| 1872, | 21,212 | 1882, | 19,414 |
| 1873, | 20,649 | 1883, | 19,696 |
| 1874, | 22,655 | 1884, | 18,898 |
| 1875, | 24,629 | 1885, | 20,105 |
| 1876, | 22,376 | 1886, | 20,080 |
| 1877, | 21,871 | 1887, | 20,646 |
| 1878, | 20,590 | 1888, | 20,706 |
| 1879, | 19,450 | 1889, | 20,691 |
| 1880, | 19,413 | 1890, | 20,836 |

The mean annual ratio of marriages, as compared with each 1000 unmarried men of marriageable age for the whole country, was 52 per 1000; the highest ratio, 77 per 1000, prevailed in Canton Glarus, and the lowest, 34, in Canton Uri. The mean annual rate was greater among Protestants than among Catholics, and also slightly greater among the German than among the French-speaking Swiss. The age at which the greatest number of men married during the twenty-years period was 25, while women married in the greatest numbers at 22, although nearly equal numbers of men married at 24, 25, and 26, and of women at 22, 23, and 24.

By seasons, the least daily number of marriages were celebrated in January, December, and August, and the greatest in May, October, and November. The mean daily number for the whole period was 56.

Since 1876 a record was kept of the number of marriages dissolved by the death of husband or wife. Out of each 100 marriages dissolved 53 were in consequence of the death of the husband, 42 by that of the wife, and the remaining 5 by divorce. The mean duration of marriages during the period of observation (1876–90) was for the whole country 24.2 years, the extremes being 28.7 years in Canton Ticino and 22.0 years in Bâle (city).

The divorces appear to have diminished, both in absolute numbers and relatively, from 1102 and a ratio of 2.48 per 1000 existing married couples in 1876, to 880 and a ratio of 1.86 in 1890. The various conditions and circumstances of the divorced are considered separately.

Divorces among Catholics were in the ratio of only 0.67 to each 1000 existing married couples, and 2.65 among Protestants, while among mixed marriages the ratio was 4.02. In the country the ratio was 1.80 and in the cities 3.82. In the different cantons the ratio varied from 1.29 in Fribourg to 5.70 in St. Gall.

The duration of marriage among the divorced shows that very few persons were divorced who had been married less than one year, the greatest numbers being among those who had been married from six to ten years and from eleven to twenty years.

The legal causes of divorce were in the following ratio: —

GENERAL CAUSES.

| | |
|---|---|
| Mutual consent, and conditions which rendered conjugal life insupportable, | 35 per cent. |
| Great relaxation of the marriage tie for other reasons, | 35 " " |

SPECIAL CAUSES.

| | |
|---|---|
| Adultery, | 14 per cent. |
| Attempts to take life, cruelty, or severe injury, | 19 " " |
| Conviction of an infamous crime, | 5 " " |
| Desertion, with evil intent, | 13 " " |
| Mental alienation of long duration, | 2 " " |

The whole number of divorces in Switzerland in the five years 1886–1890, in a mean population of about 2,900,000, was as follows: —

| | |
|---|---|
| 1886, | 899 |
| 1887, | 925 |
| 1888, | 841 |
| 1889, | 865 |
| 1890, | 880 |

Three finely-colored charts accompany the document, showing the following ratios: —

Chart I presents the usual ratio of marriages to each 1000 of the total population in each district.

Chart II shows the ratio of marriages to the number of unmarried but marriageable men (18 years and over).

Chart III shows the ratio of divorces to the number of existing married couples in each district.

A colored diagram is also given, presenting the marriages by sexes and age periods, for the ten-years period 1881–90.

S. W. A.

*Annual Report of the Central Sanitary Bureau Attached to the Home Department of the Imperial Japanese Government, for the Twenty-fifth Year of Meiji (1892).* Tōkyō, 1895.

The contents of this report consist of the vital statistics of Japan for 1892; the prevalence of infectious diseases; the examination of prostitutes; a brief report upon the water supply of cities; the registration of physicians, druggists, and midwives; analyses of drugs, etc.

The population of Japan in 1892 was 41,268,732.

| | |
|---|---|
| The marriage rate was, . . | 8.48 (16.96 persons married) |
| " birth " " . . | 29.25 |
| " death " " . . | 21.76 |
| Excess of births over deaths, | 7.49 |

The still-births constituted 8.7 per cent of the total number. The ratio of male to female births was as 1047 males to 1000 females. The birth rate has slightly increased during the ten years 1883–92, from 26.7 per 1000 in the first five years to 28.7 in the last five years. The illegitimate births constituted 6 per cent of all births. The divorces in 1892 were 113,498, or nearly one-third as many as the marriages during the year. Employing the Swiss method of comparison, the divorces were in the ratio of 15 to each 1000 existing married couples. This enormous divorce rate may possibly be explained by conditions detailed in later pages of the report.

The deaths of males were 458,970, and of females 439,026; but since the population by sexes is not given, the death rate of each sex cannot be accurately stated.

The mortality and the prevalence of the principal infectious diseases are shown in the following table: —

| | Cases. | Deaths. | Fatality, per Cent. |
|---|---|---|---|
| Cholera | 874 | 497 | 56.6 |
| Typhoid fever | 35,636 | 8,529 | 23.9 |
| Dysentery | 70,842 | 16,843 | 23.8 |
| Diphtheria | 4,359 | 2,531 | 58.1 |
| Typhus fever | 281 | 62 | 22.1 |
| Small-pox | 33,779 | 8,409 | 24.9 |

The principal points of interest in the foregoing table are the great decrease in cholera since 1890, when there were 46,019 cases and 35,227 deaths; the marked increase in dysentery over the previous year; and the prevalence of small-pox, which also amounted to a serious epidemic, there having been only 3608 cases in 1891 and 296 in 1890.

This unusual prevalence of small-pox led to greater care and vigilance in the enforcement of vaccination. The whole number of vaccinations performed during the year was 3,988,761, or 9.6 per cent of the whole population of Japan.

The total number of prostitutes examined in 1892 was 1,431,199, or about 15 per cent of all women between the ages of 15 and 50 years of age. This number was greater by 150,293 than that of 1891.

Licenses to practice medicine were issued to 879 persons, of whom 376 had passed examination, 443 had graduated from the medical department of the Imperial University, and 60 were from other sources. The actual number in practice in 1892, including the foregoing and deducting deaths, was 40,093. The number of registered midwives in practice in 1892 was 1398, the number of pharmacists 2716, and of druggists 13,225, but it does not appear what distinction is made between these classes.

The ratio of the population to each licensed physician was 972. Under the laws relating to the examination for the practice of medicine, dentistry, and pharmacy, it appears that 2354 candidates applied for the primary examination, of whom only 256 were successful, and 1399 for the final examination in medicine, of whom 156 were successful. In dentistry 117 candidates applied and only 11 passed a successful examination. In pharmacy the ratio of successful applicants was greater; 86 out of a total of 345 were successful.

S. W. A.

*Jahresbericht über die Verwaltung des Medicinalwesens die Kranken-Anstalten, und die öffentlichen Gesundheitsverhaltnisse der Stadt Frankfurt a. M.* xxxviii. 1894. Frankfurt a. M., 1895.

This report contains the principal facts relating to the meteorology, population, and vital statistics of Frankfurt-on-the-Main for the year 1894, together with a statement of the public health administration, and the hospitals and charitable institutions — public and private.

The population in 1894 was estimated to be 201,000, having more than doubled since 1874, when it was 99,370.

The births in 1894 were in all 5644, of which number 158 were still-born and 726 were illegitimate. The deaths, exclusive of still-born, were 3270. The marriages were 2040. These numbers were equivalent to a marriage rate of 10.2 marriages per 1000 of the population, or 20.4 (persons married), 28.1 births per 1000, and 16.3 deaths per 1000.

The mean of the 40-year period, 1851–90, was as follows: Marriage rate, 8.6; birth rate, 27.2; death rate, 19.3.

The birth rate of illegitimates ranged from a maximum of 200.3 per 1000 births in the period (1861–65) to 102.9 per 1000 in the period (1876–83).

The most distinctive causes of death in 1894 were the following, expressed in terms of mortality per 100,000 inhabitants: —

| | | | |
|---|---|---|---|
| Consumption, | 278.6 | Infantile debility, | 60.2 |
| Pneumonia, | 113.9 | Old age, | 67.7 |
| Diphtheria, | 99.5 | Whooping cough, | 23.4 |
| Diseases of brain and spinal cord, | 226.9 | Measles, | 20.4 |
| Heart diseases, | 123.9 | Influenza, | 10.5 |
| Diseases of digestive system, | 247.3 | Suicide, | 37.8 |

A brief statement is presented of the burial regulations, the inspection of food, the public vaccine service, and the notification of infectious diseases. The latter include diphtheria, scarlet fever, measles, typhoid fever, and puerperal fever.

The latter half of the volume is chiefly devoted to the hospitals, public and private, while a semi-official chapter is occupied with a report of the transactions of the Medical Society of Frankfurt in 1894, embracing the literary work of the Society, additions to its library and museum, and a necrology for the year.

S. W. A.

*Anuario Demográfico de la Republica Oriental del Uruguay. Año 1894.* Director, L. C. Bollo. Montevideo, 1895.

The vital statistics of Uruguay do not differ materially from those of other South American countries. The birth rate is high, while the death rate and the marriage rate are comparatively low. Peculiar methods are employed for estimating the ratios for each year. The population is estimated to have been 748,130 on January 1, 1894, and 776,314 on January 1, 1895, showing an increase of 28,184 dur-

ing the year. Yet the birth rates, etc., are all calculated from the former figures (January, 1894); the Director also estimates a loss of 6 per cent by omissions, which would give a population of 822,892 on January 1, 1895. Disregarding the estimated loss by omissions, it would seem proper at least to have calculated the birth rates, etc., from the estimated population at the mid-year.

The births, deaths, and marriages for 1894 were as follows: —

| | |
|---|---|
| Births, | 28,486 |
| Deaths, | 13,843 |
| Marriages, | 3,852 |
| Birth rate per 1000 of the population, | 38.07 |
| Death rate " " " " " | 18.53 |
| Persons married, | 9.82 |
| Still-births per 1000 of the population, | 1.07 |

The Director estimates the mean annual birth rate for the ten years ending with 1894 as 40.72; mean death rate, 18.53; mean excess of birth rate, 22.19; mean still-born rate, 0.94; mean marriage rate, 5.59. These figures should read as follows: 40.58, 18.55, 22.03, 0.95, 5.55, since the compiler has committed the error of dividing the sum of the birth rates and death rates for the ten years by 10, in order to obtain a mean annual rate, while the correct method consists in the comparison of the sum of the annual populations with the sum of the births and deaths for ten years.

In the city of Montevideo the birth rate of 1894 was 31.2, the death rate 17.8, and the marriage rate 5.2 per 1000. The birth rate of the country has diminished during the decade, the maximum being 42.4 in 1886, and the minimum 37.6 in 1893. The death rate has varied but little. The marriage rate has diminished from a maximum of 6.5 in 1885 to a minimum of 4.6 in 1893.

The ratio of male to female births for the period of ten years was as 1000 females to 1052 males. (The ratio of Massachusetts for 41 years was as 1000 females to 1055 males, and that of England for 56 years was as 1000 females to 1043 males.) The greatest number of births occurred in September, 2672, or 89.1 per day, and the least in February, 1935, or 69.1 per day. The daily average for the year in 1894 was 78. Illegitimate births have increased regularly, from 19 per cent of all births in 1890 to 23 per cent in 1894. Different districts present very different figures, that of San José having the least, or about 9 per cent for five years, and Soriano the highest percentage, or 41 per cent in 1893 and 1894. The percentage in the

city of Montevideo has increased from 10 per cent in 1890 to 13.7 in 1894.

The most destructive causes of death were the following, in terms of the total mortality: —

| | | |
|---|---|---|
| Small-pox, | 6.0 | per 1000 deaths from all causes. |
| Scarlet fever, | 4.6 | " " " " " " |
| Diphtheria, | 16.5 | " " " " " " |
| Whooping cough, | 9.4 | " " " " " " |
| Influenza, | 14.7 | " " " " " " |
| Tuberculosis (in all its forms), | 93.3 | " " " " " " |
| Cancer (in all its forms), | 24.6 | " " " " " " |
| Typhoid fever, | 41.3 | " " " " " " |
| Broncho-pneumonia, | 24.1 | " " " " " " |
| Pneumonia, | 33.7 | " " " " " " |
| Enteritis, | 12.6 | " " " " " " |
| Gastro-enteritis (infantile), | 35.8 | " " " " " " |
| Entero-colitis, | 5.7 | " " " " " " |
| Puerperal diseases, | 4.6 | " " " " " " |

Under the head of infant mortality a very good classification is made into months, and for the first month of life into weeks. The most destructive causes of death among infants were whooping cough (which was most fatal in the second and third months of life), infantile debility, meningitis, convulsions, bronchitis, and gastro-enteritis.

S. W. A.

In the March number of the *Political Science Quarterly*, Vol. II, No. 1, 1896, is an article by Prof. Charles Henry Hull, entitled *Graunt or Petty? the Authorship of the Observations upon the Bills of Mortality.* Dr. Bevan, in a recent monograph on Sir William Petty, favors the view that Petty was the author of *Observations upon Bills of Mortality.* Dr. Hull revives the testimony and inclines to the older opinion that Graunt wrote the book.

*Annual Summary of Births, Deaths, and Causes of Death in London and other Large Towns, 1894.* London, 1895. Pp. lxxxvi.

During 1894 the birth rate of London was the lowest for any year on record. The net gain of life during the year, from a comparison made with the average death rate from 1884–93, is represented by 11,660 lives. Of the 77,039 deaths in London, 23.7 per cent took place in public institutions, including 13.4 per cent in workhouses and workhouse infirmaries. Thus, in London about one in every seven deaths occurred in a workhouse or workhouse infirmary.

In the *Transactions of the Actuarial Society of America* for April 25, 1895, is a paper on the *Rates of Death Loss among Total Abstainers and Others*, by Emory McClintock. The paper deals with the experience of the Mutual Life Insurance Company of New York, the data beginning with the year 1875. Upon those who on entering stated that they were total abstainers from alcoholic beverages the maximum expected loss was $5,455,669; the actual loss was $4,251,040. Upon those who stated otherwise the maximum expected loss was $9,829,462, and the actual loss was $9,469,407. The abstainers show, therefore, a death loss of only 78 per cent of the maximum, and the non-abstainers 96 per cent.

The Mutual Life Insurance Company has recently published a Report by its Medical Director, Dr. Marsh, upon the value of family history and personal condition in estimating the liability to consumption. The material covers the period 1879–93, embracing over 22,000 cases. There were 1994 cases of consumption with consumption in the family record. Dr. Marsh states that the statistics warrant the conclusion that the history of consumption in any member of the immediate family increases the probability of its appearance in the applicant, and that consumption in a brother or sister is at least of equal importance as when it has occurred in the parent; that persons who are under the standard or average of weight are much more liable to consumption than those above this standard, and that evidence presented by a well-developed body may outweigh the suspicion attached to unfavorable family history.

## MIDDLE-CLASS EXPENDITURE.

*Some Statistics of Middle-Class Expenditure.* Edward Grubb, M.A. *The Economic Review*, Vol. VI, No. 3. Pp. 358–370.

Statistics of expenditure have been collected, as a rule, wholly from the working classes, for the reason that the co-ordination of expenditure and income is of such importance to the comfort and even to the possibility of sustaining life in these classes.

In a broader study of consumption and its relation to industry, the investigation of expenditure must not stop with the families of limited income, but must comprehend in its scope the uses of wealth in all grades of society.

Mr. Grubb in this article gives the result of a limited but apparently trustworthy investigation into the expenditures of the middle class in England. His method was direct and simple. He sent out 150 blank forms to his friends and to the friends of his friends, with the request that they might be filled out and returned to him anonymously. Out of the 150 blanks 42 were returned in a condition that made them available for the purpose of his investigation. Many of his correspondents were members of the Society of Friends, of which body he is a member. This fact should be borne in mind when considering the statements sent in in regard to the amount spent for drink, charity, sport, and entertainment.

Mr. Grubb divides the families from which he received returns into four classes: A (over £900), B (£900–600), C (£600–300), D (under £300). Class A contains 8 families; Class B, 10 families; Class C, 12 families; Class D, 12 families. Two families spend over £2000 and one spends less than £200 annually. Eleven out of the 42 spend between £200 and £300 a year. The average total number of persons, including servants, in a family is as follows: —

| | |
|---|---|
| Class A | 9.7 |
| Class B | 7.4 |
| Class C | 6.3 |
| Class D | 3.9 |

With these classes is compared the expenditures of the average of 20 artisan families, whose average total number of persons in a family is 5.9, and whose incomes vary from £64 to £156.

Tables are given showing expenditures *per family* in each group, and also expenditures *per head.* The drop between successive classes is considerable, and is least in the case of food and greatest in that of clothing. The expenditures *per head* are very unsatisfactory, inasmuch as no account is taken of the ages of the various members of the family, and of course, in a consideration of expenditure for food and clothing, this is an important factor.

The expenditure for clothing *per head* varies from £41 to £60. This last figure represents "all draperies" as well as clothing; but even then it shows the enormous difference in this item. When we come down to the artisan class an extraordinary drop is shown. "The cost *per head* in this group for rent, fire, and light is about one-quarter, for food scarcely more than one-half, and for clothing less than one-sixth of what it is in the most economical group of the middle class."

The expenditures for travel and holidays, charity, and insurance bear a fairly constant proportion to the general expenditures, but that for education and doctors and nursing shows great extremes and unexpected fluctuation. This again shows the need of a careful consideration of age in a discussion of results, for, of course, expenditures in these two lines depend greatly on the number of children in the family.

The author frankly admits the imperfection of the results obtained, and speaks of "the need of long and patient inquiry before any figures of real value can be obtained." In conclusion he suggests a schedule for the use of those who are willing to aid such investigation by keeping an expense account.

## SOCIOLOGICAL STATISTICS OF NEW YORK CITY.

*The Federation of Churches and Christian Workers in New York City. First Sociological Canvass.* Supervised and Tabulated by Rev. Walter Laidlaw, Secretary. Pp. 112.

The object of the Federation of Churches is to combine the isolated forces of the Christian workers in New York city into an organization whose efforts for the good of the community can be effectually directed by a central committee. A practical step has been taken in the canvass of a typical area of the city, within which a house-to-house investigation was carried on, "covering the social, moral, and religious condition of the inhabitants." "The area selected was the Fifteenth Assembly District, containing a population of 40,000, lying between Forty-third and Fifty-third Streets, and running irregularly from Eighth Avenue to the Hudson River."

The statistics given in the Federal Census of 1890, the Tenement House Committee's Report of 1894, the Police Census of 1895, and the School Census of 1896, were readjusted and corrected from the results of the canvass. The actual number of persons out of 40,000 in the district reached by the canvassers was 33,891. Most of the visitors were volunteers, who had no previous experience in gathering statistics. In this connection it is to be noted that the report recommends the employment of trained and paid canvassers in future surveys.

The charts of general interest are as follows: —

Chart I, showing aggregate population, acreage and density per acre for London, Paris, Berlin, New York, Vienna, and Tokio. This chart shows that the density of the population per acre south of the Harlem is greatest of all the cities in the world. It is 129.2 per acre. Seven individual blocks in this area contain over 3000 people each.

Chart II, showing number of persons to a dwelling in the cities of the United States whose average of inmates per dwelling, in 1890, was above eight persons. New York averages 18.52.

Chart III, showing percentage population in dwellings containing 21 persons and over in cities having 10 per cent of population so housed, census of 1890. New York has 66.70 per cent of its population in dwellings so inhabited.

As would be expected, religious statistics form the larger part of the report. In the district under consideration the Irish are found to exceed greatly in church membership, and the Americans to be much behind other nationalities, but in school attendance the reverse is the case: 68.5 per cent of the Irish are church members; 66 per cent of public school age are in school; 51 per cent of the Americans are church members; but 70 per cent of the children of public school age are in school. The non-church attendants number 18,476, or about one-half of the entire population of the district canvassed. Among interesting facts brought out in the religious statistics is the remarkable division of the Protestant church. The Protestant church membership of 5922 is divided among 21 denominations. The income of the churches in the district is compared with the income of churches in less densely populated districts, and it is seen that the entire value of the Protestant churches in the district is but little more than half the value of a single up-town church, while the population is 500 per acre, as against 100 per acre up-town.

In school attendance the entire district (and it is to be remembered that this is a typical section of the congested area) is not up to the standard; for out of 6036 children of school age, 1850 are out of school, and of the number in school but 31 are over 14 years of age. So out of the 15,258 children in the district, 31 only are receiving more than the rudiments of an education!

The most interesting part of the report is that devoted to the study of environment. A map is given showing "Home Environment of

the Fifteenth Assembly District, before and after the Raines Law." The report states that the Raines bill has unquestionably been a great benefit to the district.

One of the discouraging features unearthed was the paucity of bath-tubs, the average being one tub to 7.9 families, and in one section the average fell to one to 17.9 families.

HARRY D. HUNT.

## STUDY OF STATISTICS.

The following courses in Statistics are announced by the London School of Economics and Political Science for the academic year 1896–97: —

1. Elementary Statistics; the Relation of Statistics to Economics; the Common Use of Statistics; selected chapters from Giffen's Essays on Finance; Jevon's Principles of Science; Charles Booth's Labour and Life in London.

2. Methods of Statistics, with special reference to industry and commerce. By A. L. Bowley, M.A.

I. General methods of statistics; collection of data; criticism and analysis of returns; interpolation and completion; tabulation and publication; averages, their meaning and use; graphic methods; criteria of accuracy of results; application of the theory of probability.

II. Practical investigation, carried on in class, to illustrate general methods (if found possible to arrange).

III. Special groups of figures; methods of collection; value of results; figures already collected; figures needing collection.

3. Methods of Statistics, with special reference to the incidence of taxation. By C. P. Sanger, B.A.

4. A class under the direction of H. J. Mackinder, M.A. The following subjects will be dealt with: The cartographic presentation of statistics; the interpretation of statistical maps; the calculation of quantities per unit of area.

5. Lectures: (1) "Life Tables," etc. By F. Y. Edgeworth, M.A., D.C.L. (2) "Statistics in relation to Historical Investigation." By W. A. S. Hewins, M.A.

## REGISTRATION OF CAUSES OF DEATH.

Mr. John B. Martin, President of the Royal Statistical Society, England, in his annual address, delivered November 17, 1896, describes the method followed in Switzerland by the Federal Statistical Bureau, in order to secure accurate returns of the causes of death from the medical profession. It appears that —

In certain cantons the doctors took refuge behind the veil of professional secrecy and refused to state the cause of death. The registrar had, therefore, to be content with the declaration and verification of death which satisfied the schedule, and left the cause of death to be declared by the relations. It happened also that the doctor in attendance gave as the cause of death a secondary complaint, as, for instance, pneumonia, when this disease was the consequence of scarlet fever or nephritis, when the primary cause was scarlatina. In order to obviate these inconveniences the Statistical Bureau, in accord with the medical profession, instituted a new certificate of death. As soon as a death is declared to the civil authorities the officer fills up the first part of the new schedule and sends it with an envelope to the doctor who has signed the open declaration. The doctor, after having assured himself of the identity of the individual, tears off the counterfoil which bears the name of the deceased, and has only to answer questions in the second part of the schedule — that is to say, to indicate primary and secondary, or immediate cause of death, as well as all information useful for statistical purposes. Having done this he returns the card to the registrar, who is not at liberty to open the envelope, but must satisfy himself that the card is therein contained. Later on the sealed envelopes are sent to the officials of the Statistical Bureau, by whom they are sorted and arranged. In this way medical confidence is safeguarded and exact returns are obtained. In this manner the series of the death returns have attained a high degree of accuracy, since they are based on confidential information given by doctors who are only actuated by the interests of medical and sanitary science.

## NOTES.

*Eighth Report on the Custody and Condition of the Public Records of Parishes, Towns, and Counties of Massachusetts.* Robert T. Swan, Commissioner. Boston, 1896. Pp. 42.

The history of the bill relating to the returning and recording of births, marriages, and deaths is again referred to, and a review is made of the agitation and legislation upon this subject in Massachu-

setts since 1841. The anomalies and ambiguities of the present returns are pointed out, and the hope is expressed that the defects and omissions will be removed by the passage of the bill which is at present before the General Court.

In the *Third Annual Report of the Massachusetts Highway Commission, 1896*, p. 12, are given tables showing the valuation of towns and cities throughout the State, with the amounts appropriated for the repair and construction of roads and bridges. These statistics are given in accordance with a law which was passed by the Legislature May 31, 1895. It appears that the total amount appropriated in the cities was $4,917,109, and in the counties $1,469,609.

*Sixty-Sixth Annual Report of the Inspectors of the State Penitentiary for the Eastern District of Pennsylvania.* Philadelphia, 1895. Pp. 143.

This report, which has been previously referred to in these *Publications* as one of the most valuable for the student of applied sociology, follows its predecessors in form. Detailed criminal histories are given of 119 prisoners, received during 1895, who had served one or more previous terms in the Eastern Penitentiary. Detailed statements are also given with regard to 52 persons who also had relatives in prison. A summarized table is given of the prison population from 1829 to 1895, in which are statistics of health, habits, social relations, etc.

*Twenty-Third Annual Report of the State Charities Aid Association of New York.* December 1, 1895. New York, 1895. Pp. 138.

A special report is given on the advisability of separating the department of public charities and corrections of New York city. February 1, 1895, this department had in its charge 18,552 persons, including inmates, officers, and employees. An error is made by the Board in saying that this means that more than a one-hundredth part of all the inhabitants of the city are wards or employees of this department. The calculator probably meant a one-thousandth part. The number of children in institutions in New York State is constantly increasing. In 1884 it was 33,558, as compared with 27,537 in 1890. The number placed in families is not increasing. In 1894 the number so placed was only 1370. There is a steady and strong growth of the institutional population in the city of New York.

The New York Association for Improving the Condition of the Poor has begun the bulletin entitled *A. I. C. P. Notes.* No. 1 of Vol. I, December, 1895, is devoted to the cultivation of vacant city lots by the unemployed. On page 22 is a comparative table of various experiments under the following headings: Number of Acres; Number of Employed; Cost; Crops; Time; Management; and Remarks.

In the Minnesota *Bulletin of Corrections and Charities* for December, 1895, page 42, is a brief statement of a pauper enumeration of June, 1895, for that State. The results of this enumeration are not regarded as altogether reassuring. While the number of paupers,—8565 in June, 1895,—was considerably less than in December, 1894, when it was 11,354, it is an increase of nearly 1000 over the enumeration of June, 1894. There is reason to fear that the hard times are to mark a permanent advance of paupers and pauperism in the population. "It is much easier to make paupers than to unmake them." "While the ratio of pauperism in the rural counties has increased 14 per cent during the past five years, the ratio in the urban district has increased 100 per cent. The ratio of pauperism in the urban counties is nearly double that in the rural counties."

*Ninth Annual Report of the General Superintendent of Prisons in Massachusetts Concerning Prison Labor.* December, 1895. Pp. 63.

A detailed account is given of the various industries carried on in the prisons and houses of correction of the State. The number engaged in productive industries in the State Prison was 513; in the Reformatory Prison for Women, 157; in the Reformatory for Men, 581; in the houses of correction, an average number of 2480.

In the *Bulletin Statistic General* for Roumania, Third Year, No. 3, 1895, is a detailed descriptive and statistical article on divorce statistics from 1864 to 1893, with an introduction by C. Crupenski, the Director-General.

The journal *Locomotive* has kept a record of the boiler explosions in the United States during the year 1895, and makes a return of 355 accidents, killing 374 persons and injuring 519. According to the same record the number of explosions for 1894 was 361; for 1893, 316; for 1892, 269.

The *Report of the Commissioner of Patents to Congress for 1894* showed that there were 36,987 applications for patents, and 20,803 granted. More patents are granted in Connecticut in proportion to the population than any other state, there being one to every 993 inhabitants. In South Carolina the rate is one to 25,581. The total expenditures of the office were $1,100,047; the receipts over expenditures, $87,392.

*Report of the Attorney-General of Massachusetts for the Year Ending January 15, 1896.* Boston, 1896.

During the year there were nine indictments for murder, particulars of which are given in this report.

The *K. K. Statistische Central-Commission* has published in connection with the *Statistische Monatschrift* an index for the first 21 volumes, from 1875 to 1895, prepared by Dr. W. Schiff.

*Third Annual Report of the Bureau of Agriculture, Labor, and Industry of Montana for the Year Ended November 30, 1896.* Helena, 1896. Pp. 405.

The state census previously ordered for 1895 has not been taken, as no appropriation was made. A statistical table is given of the work of the free employment office which has been recently established, and the experience from April 1 to December 31, 1895, is here tabulated. It appears that of the 476 male applicants positions were secured for 167. The work of the bureau is regarded as successful, although only one office has been established, namely, at Helena.

Part II is a general statistical summary on education, crime, divorce, insanity, and indebtedness. Part III is devoted to fruit growing, Part V to wages, Part VI to manual production, Part VII to agriculture, Part VIII to miscellaneous statistics. The appendix contains laws of special interest to wage-earners.

Number 6, December 18, 1895, of the *Publications of the Michigan Political Science Association* (Secretary, Henry C. Adams, Ann Arbor) is entirely devoted to city government, there being five articles on municipal government in Grand Rapids, Kalamazoo, Jackson, Saginaw, and Detroit. There is some statistical material bearing upon cost of administration in various departments.

# Publications of the American Statistical Association.

The New Series of the Association, issued quarterly, will be sent to members of the Association on payment of the annual assessment of two dollars. The subscription price is also two dollars per annum. Separate copies can also be purchased upon remittance of the advertised prices.

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